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ABSTRACT

Attrition for various demographic groups in the several major disciplinary areas represented by graduate students enrolled at New Mexico State University during the fall semesters of the years 1979, 1980, and 1981 are presented. Questions addressed include: overall rate of attrition; significant variance among students from year to year; sex ratio in attrition; which disciplines are more prone to attrition; attrition rates of ethnic minorities as compared to Anglos; length of time to complete graduate programs; and rate of conferral of degrees upon large groups of students. Variables included sex, ethnicity, degree expected, class, major, and cumulative grade-point average. Among the 12 findings are the following: (1) overall attrition is 30%, with no gender bias but a clear effect related to ethnicity; (2) engineering disciplines have a higher rate; (3) agricultural disciplines have the lowest levels of attrition; (4) students in physical sciences are primarily Anglo and foreign; (5) the mean, median, and modal times students required to complete a master's program were 25.7, 22, and 20 months, respectively. (SM)

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A STUDY OF ATTRITION AMONG GRADUATE STUDENTS AT NEW MEXICO STATE UNIVERSITY

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1988

EXECUTIVE SUMMARY

In this study of graduate students enrolled at New Mexico State University during the fall semesters of the years 1979, 1980, and 1981, we describe attrition for various demographic groups in the several major disciplinary areas represented in the graduate curriculum. Overall attrition amounted to about 30 percent for all students in all programs. This statistic varied between 15 percent and 50 percent, depending more upon discipline than upon gender or ethnicity. Students identifying themselves as ethnics exhibit higher levels of attrition. Students in the engineering disciplines exhibit a somewhat higher than average level of attrition. Students in the agricultural disciplines exhibit lower than average levels of attrition. Students in the education disciplines exhibit a level of attrition slightly higher than average. The physical sciences attract primarily Anglos and foreign students. Ethnics constitute a small percentage of total enrollment in the physical sciences, but their level of attrition is much higher than the university average. Foreign students show average levels of attrition in engineering, but much lower than average levels in agriculture and the physical sciences. With regard to students who complete master's programs, the time required for completion varies considerably. The mean, median, and modal times to complete a master's program were 25.7, 22, and 20 months, respectively. Students required more time to complete programs in engineering (28 months), physical sciences (32 months), and the life sciences (36 months). The results, expressed in terms of percentage of students finishing in a time equal to or less than the mean time, indicate a slight gender effect favoring male students in

several disciplines. In measurements that permitted an estimation of the time required to grant one-half the theoretical maximum number of degrees ($t_{\frac{1}{2}max}$) to a large group of students, a gender effect favoring male students was observed with regard to candidates for the master's degree. The average $t_{\frac{1}{2}max}$ for all students was 23.8 months; for males $t_{\frac{1}{2}max}$ was 22.3 months, and for females $t_{\frac{1}{2}max}$ equaled 26.7 months. No obvious gender effect was discerned among candidates for the doctoral degrees. In this group $t_{\frac{1}{2}max}$ for the entire group equaled 42.0 months; for males $t_{\frac{1}{2}max}$ equaled 39.6 months, and for females 42.6 months.

ACKNOWLEDGEMENTS

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Introduction and Methodology

This study of attrition among graduate students was conceived in the spring of 1986. At that time attrition was under intense discussion as an important factor in recruitment and retention of undergraduate students. At that time there was also a recognition that graduate programs contribute importantly to the maintenance of academic and fiscal viability of the institution as a comprehensive research university. The data and information presented here were developed in response to the general question, "How many graduate students are we losing?" In this report we attempt to provide a quantitative answer to that question.

Questions Addressed

The major thrust of this study concerned attrition among graduate students and whether gender was a measurable factor. However, it became apparent early on that to answer this question it was necessary to consider other factors such as discipline and ethnicity. Also, information regarding the rate of progress of students through the several programs and disciplines appeared to be desirable. Finally, we needed a method for describing cohorts of students as populations. In particular we needed a method for describing the kinetics of degree conferral on a cohort of students. In this report the following specific questions will be addressed.

1. What is the overall rate of attrition among graduate students?
2. Does it vary significantly among students from one year to the next?

3. Are women more prone to attrition than men?
4. Are students in certain disciplines more prone to attrition than in others?
5. Are ethnic minorities more prone to attrition than Anglos?
6. What is the length of time required for students to complete graduate programs? Do women require more time than men? Do students in certain disciplines require more time than those in others?
7. What is the rate of conferral of degrees upon large groups of students? Is there a gender difference apparent in this dimension?

Data Files

To obtain answers to these and related questions we secured data files on graduate students registered in the fall semesters for the years 1979, 1980, and 1981. The data contained in the files were supplied by the University Computer Center and contained the following elements:

Name

Social Security Number

Sex

Ethnicity

State or Country of Legal Residence

Degree Expected

Class

Major

Cumulative Grade-Point Average

Date First Attended

Date Last Attended

Date Degree Granted

Administrative Code for Degree Granted

The files were formatted, sorted, and enumerated with a software product called "Reflex", which was obtained from the Small Systems section of the university Computer Center (1).

There were minor irregularities and uncertainties present in the files obtained from the Computer Center. Chief among these were

1. Files were obtained only for students enrolled on a certain date in the fall term of the years 1979, 1980, and 1981. Students enrolled at other times during those semesters were not included. Enrollment fluctuates from day to day depending upon drops and adds.
2. Students who were enrolled at the indicated times and who received more than one degree were represented in the files more than once because of peculiarities in the file structure.

As will be shown below, these uncertainties did not introduce a measurable effect on the results and conclusions to be presented.

We obtained 1431 records of students registered in the fall of 1979. The enrollment statistics reported by the office of the Graduate School indicated that as of 15 October 79 there were 1395 students enrolled (Appendix Table A1). For fall 1980, 1347 records were obtained for this study. For that semester the reported graduate enrollment was 1410 (Appendix Table A2). In 1981, we reported a

graduate enrollment of 1458 (Appendix Table A3). For that year we obtained a total of 1392 records for use in this study.

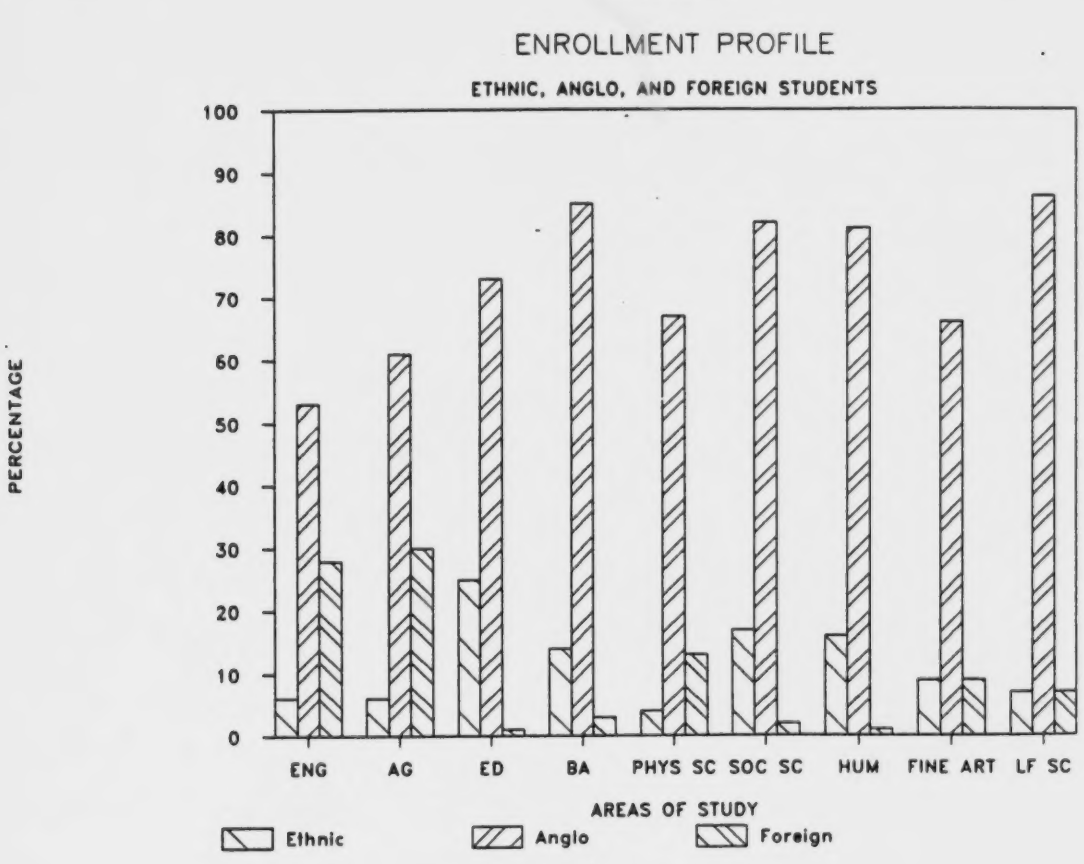
Demographic Considerations

The demographic profile of enrollment presented in Figure 1 shows the percentage composition of the graduate student body enrolled in the several disciplinary areas represented in this study. The height of the bars indicates the percentage of the total enrollment consisting of ethnic, Anglo, or foreign students. Data from which the figure is constructed are averaged percentages taken from the three enrollment periods selected for this study. The disciplinary areas are composed of the departments and/or programs indicated in the legend of the figure. The gender mix for each disciplinary grouping is also indicated in the legend.

Gender was easily determined for each student whose record(s) were included in the samples. Foreign students were also easily identified, but securing accurate information on ethnicity was somewhat problematic. Students are requested (but not required) to supply information regarding ethnicity. Students who identified themselves voluntarily as Black, Oriental, Hispanic, or Native American were grouped as "ethnics" in this study. Those who identified themselves as Caucasian were designated as "Anglo" in this study. A small number of students declined to identify their ethnicity. Some of them were included in the "ethnic" category on the basis of other evidence, such as name, appearance, or personal knowledge.

The demographic profile of graduate enrollment must be considered carefully when interpreting the data presented below. Care should be taken to avoid attributing a difference in attrition to gender or

FIGURE 1.



LEGEND:

Engineering (Eng)
N = 183; 90% male; 10% female

- Chemical Engineering
- Civil Engineering
- Industrial Engineering
- Mechanical Engineering
- Electrical Engineering

Agriculture & Home Economics (Ag)
N = 249; 77% male; 23% female

- Agronomy
- Agricultural & Extension Education
- Agricultural Economics & Economics
- Animal Science
- Horticulture
- Home Economics
- Fishery & Wildlife Sciences
- Range Science

Education (Educ)
N = 461; 34% male; 66% female

- Curriculum and Instruction
- Counseling and Educational Psychology
- Educational Specialties
- Educational Administration

Business Administration & Economics (BA&E)
N = 73; 66% male; 34% female

- MBA
- Accounting

Social Sciences (Soc Sci)
N = 85; 73% male; 27% female

- Psychology
- Government
- Sociology

Humanities (Hum)
N = 79; 23% male; 77% female

- English
- History
- Spanish
- Speech

Fine Arts (Fine Arts)
N = 31; 37% male; 63% female

- Art
- Music

Life Sciences (Life Sci)
N = 60; 69% male; 31% female

- Biology

Physical Sciences (Phys Sci)
N = 167; 81% male; 19% female

- Mathematics
- Physics
- Chemistry
- Geology
- Computer Science

N = 3-year rolling average number of enrolled students

ethnicity when the difference may in fact be a more general characteristic of the discipline.

Several interesting demographic features of our graduate student body are apparent in these data and are shown in Figure 1.

1. The gender mix varies dramatically from one area to another. Women predominate in education, the humanities, and fine arts. Men predominate in engineering, agriculture, business administration and economics, physical sciences, social sciences, and life sciences.
2. In all areas, Anglo students are the predominant group. education enrolls the highest percentage of ethnic students. Ethnic students exceed 10 percent of enrollment in education, business administration and economics, social sciences, and the humanities. Among ethnics in education, 62 percent are women; 38 percent are men.
3. Foreign students are concentrated in three main areas: engineering (nearly 38 percent of the engineering enrollment), agriculture (more than 30 percent), and physical sciences (about 12 percent). More than 90 percent of all foreign students are in these three areas.
4. Nearly all (95 percent) of the foreign students in engineering, agriculture, and physical sciences are men.

What is Attrition and How is it Measured?

In a study of this sort, it is necessary to define the terms used in an operational sense. The term attrition is given six definitions in Webster's Third International Dictionary. None of these definitions is appropriate to the use of the term in this study. The term is used here very specifically to describe or include those students who were registered during the time covered by the study, but who had not received a graduate degree from New Mexico State University by July 1986. "Attrition" as used here should not be interpreted as "unsuccessful." Many students who were registered at the times indicated never intended to work toward a degree. Some students withdrew from the university in order to pursue their objectives at another institution. Some students awaiting admissions decisions from professional schools for example, may have become graduate students during the interim period between completion of undergraduate work and entrance to a professional school.

The Measurement of Overall Attrition

For overall attrition, the records of students from all three years were sorted on the basis of gender, and further on the basis of degree conferral. The results are presented in Table 1. It is immediately apparent that "attrition" as used here describes just under 30 percent of the enrolled students whose records were included in this study. It is also apparent that females (40 percent of the total) are not obviously overrepresented in this group.

Table 2 presents the results of a sort of the files in which we measured attrition among all persons who were identified as ethnics.

Table 1. Attrition among all students in all programs for the entire period under study

	1979		1980		1981	
	Male	Female	Male	Female	Male	Female
Enrolled[a]	873	608	850	548	856	590
Attrition[b]	248	174	230	143	239	182
Percentage[c]	28	29	27	26	28	31

[a]Total number of student records obtained for the indicated years.

[b]The number of records of students who had not received a graduate degree from the university by July 1986.

[c]The rate of attrition for each group of students.

Table 2. Attrition among ethnic students in all programs for the entire period under study

	1979		1980		1981	
	Male	Female	Male	Female	Male	Female
Enrolled[a]	114	101	124	96	118	104
Attrition[b]	40	35	41	28	35	45
Percentage[c]	35	35	33	29	30	43

[a]Total number of student records obtained for the indicated years.

[b]The number of records of students who had not received a graduate degree from the university by July 1986.

[c]The rate of attrition for each group of students.

This group also included a small number of files of students who did not supply information that would permit positive identification of ethnicity. As indicated above, ethnicity of these students was inferred from other evidence. From Table 2 it is apparent that attrition among ethnic students is somewhat higher than attrition among all students. This trend is confirmed in Table 3, which shows attrition among Anglo students in all programs. It is also apparent that a slight gender bias appears among ethnics with females (46 percent of the total) exhibiting a somewhat higher level of attrition than males. Note the absence of this trend in the Anglo group described in Table 3. In this group, females constitute 40 percent of the total.

The overall average attrition for all graduate students is 28.2 percent with a standard deviation of 1.7. The average attrition rate for males is 27.7 percent and for females, 28.7 percent. Among ethnic students the overall attrition rate is 34.2 percent with a standard deviation of 5. Attrition for male ethnic students is 32.7 percent and for females the rate is 35.7 percent. Females in this group may be slightly overrepresented. Among Anglo students the average attrition is 26.8 percent with a standard deviation of 1.2 and no gender effect is apparent.

Attrition and the Several Disciplinary Areas

We next considered the possibility that certain disciplinary areas might be characterized by rates of attrition that were quite different from the overall rates of attrition described in Tables 1, 2, and 3. Toward this end, we sorted the files on the basis of major

Table 3. Attrition among Anglo students in all programs for the entire period under study

	1979		1980		1981	
	Male	Female	Male	Female	Male	Female
Enrolled[a]	759	507	726	452	738	486
Attrition[b]	208	139	189	115	204	137
Percentage[c]	27	27	26	25	28	28

[a]Total number of student records obtained for the indicated years.

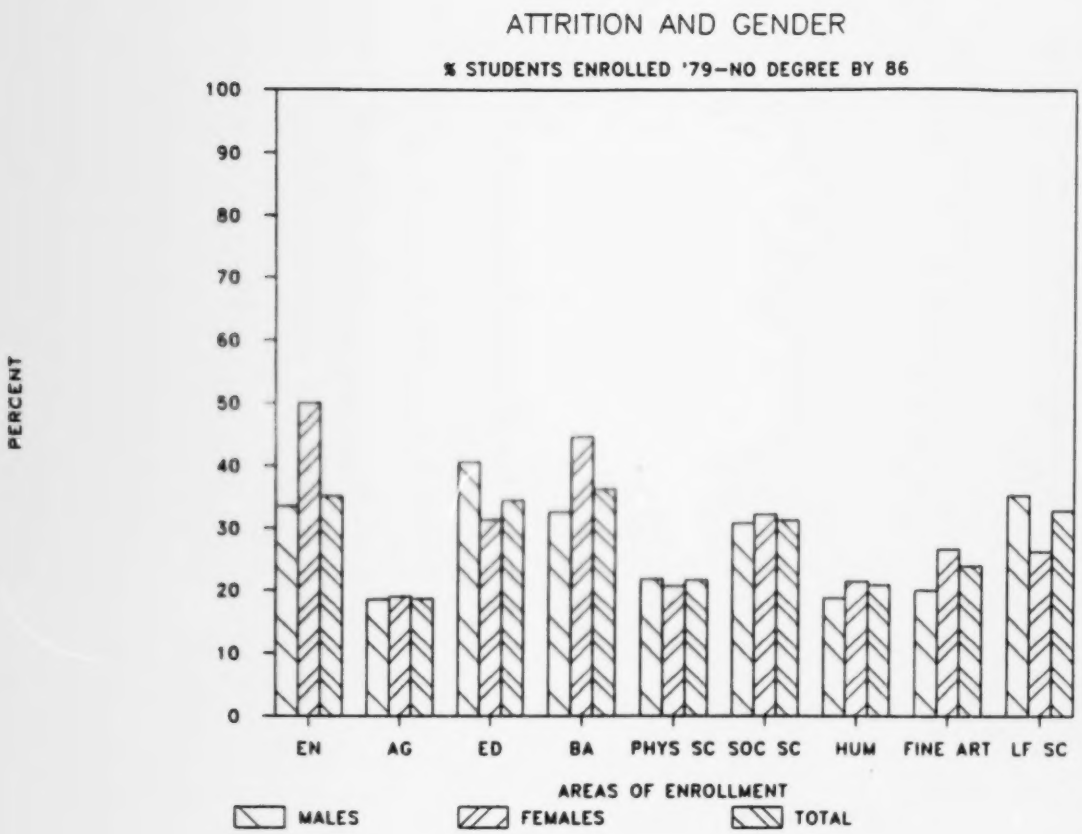
[b]The number of records of students who had not received a graduate degree from the university by July 1986.

[c]The rate of attrition for each group of students.

area or discipline as indicated in Figure 1. We then determined the attrition for the entire group of students within the discipline, and the attrition for men as compared with women.

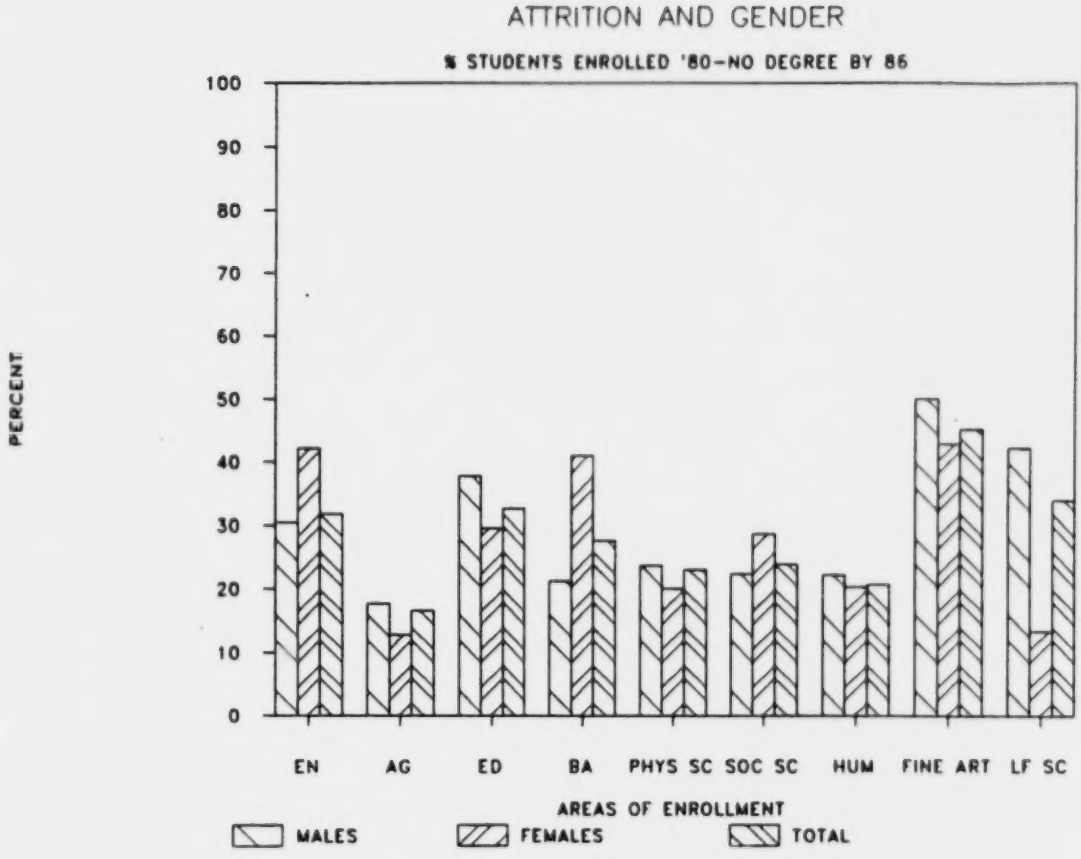
Figure 2 shows the results for students registered in the fall semester 1979, Figure 3 the fall of 1980, and Figure 4 the fall of 1981. Engineering, as a discipline, showed a level of attrition somewhat above the all-university average. Women were slightly overrepresented. Attrition in the agricultural disciplines was clearly well below the average for the university. Attrition in education was somewhat above the average. It should be noted that many students in the education disciplines may have attained their objectives without having earned a degree. The results with students in business administration were mixed: no trend was apparent. Students in the physical sciences appeared to exhibit a lower level of attrition than the average for the university. Students in the social sciences were right on the university average. No gender bias was apparent. Humanities students were somewhat below the university average. The fine arts disciplines were above the university average, but the total numbers were small. Students in the life sciences appeared to be somewhat above the university average. Some of the life sciences students included in the attrition group may have dropped out to enter professional schools in the health sciences. No clear gender bias was apparent in the results presented in these figures. There may have been a slight gender bias with males in engineering and business administration showing somewhat lower levels of attrition.

FIGURE 2.



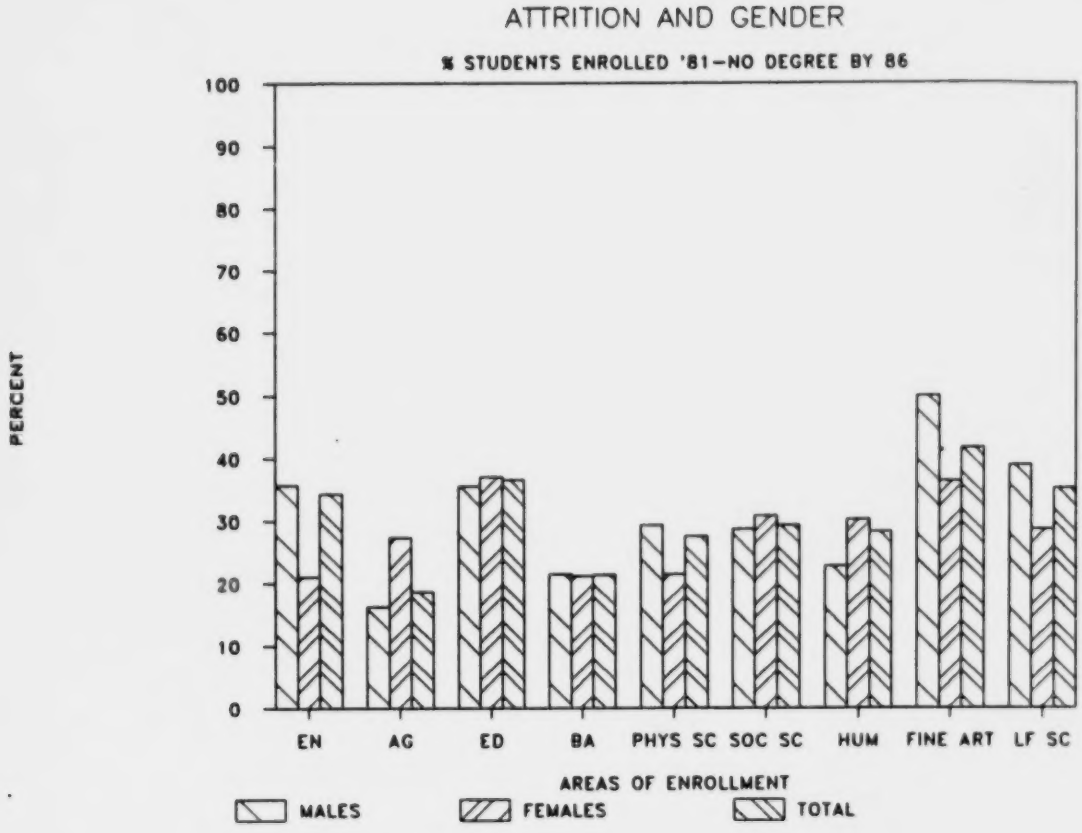
Legend. Attrition as it relates to gender of graduate students enrolled in Fall 1979. The values on the ordinant are percentages of students who had not recieved a master's degree by July of 1986. The disciplinary areas indicated on the abscissa are defined in the legend of Figure 1.

FIGURE 3.



Legend. **Attrition as it relates to gender of graduate students enrolled in Fall 1980. The values on the ordinant are percentages of students who had not recieved a master's degree by July of 1986. The disciplinary areas indicated on the abscissa are defined in the legend of Figure 1.**

FIGURE 4.



Legend. Attrition as it relates to gender of graduate students enrolled in Fall 1981. The values on the ordinant are percentages of students who had not recieved a master's degree by July of 1986. The disciplinary areas indicated on the abscissa are defined in the legend of Figure 1.

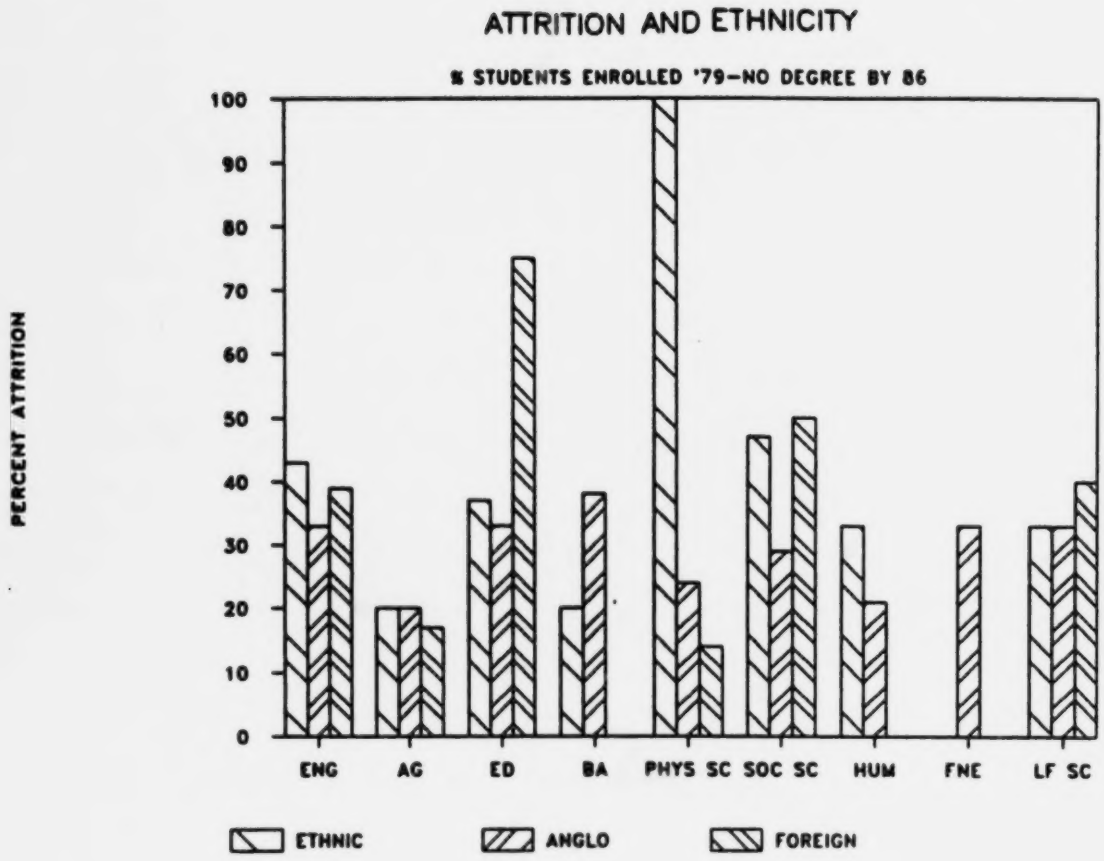
Ethnicity and National Origin as Related to Attrition in the Several Disciplines

Figures 5, 6, and 7 show the results obtained when the files were sorted, first on the basis of major disciplinary area and next, on the basis of ethnicity, and national origin without regard to gender. In Figure 5, attrition among these groups of students enrolled in fall 1979 is depicted. From the data presented in Figure 1 it is apparent that ethnic enrollment exceeds 10 percent of the total enrollment in only three areas, namely, education, business administration, and the social sciences. Ethnic enrollment in education amounted to about 25 percent. In every area except agriculture and business administration, the attrition of ethnics exceeded the overall average of 29 percent (Fig. 2). In engineering, physical sciences, and social sciences, ethnic attrition was appreciably above the average. As shown in Figures 6 and 7, the same trends were exhibited by the ethnic students enrolled in the fall semesters of 1980 and 1981.

The largest single group of ethnic students was enrolled in education. Table 4 shows the numeric detail of attrition among these students. The average ratio of men to women in this group was essentially 4 to 6. Attrition averaged 36 percent. No pervasive gender bias was apparent. This rate was substantially above the overall university average.

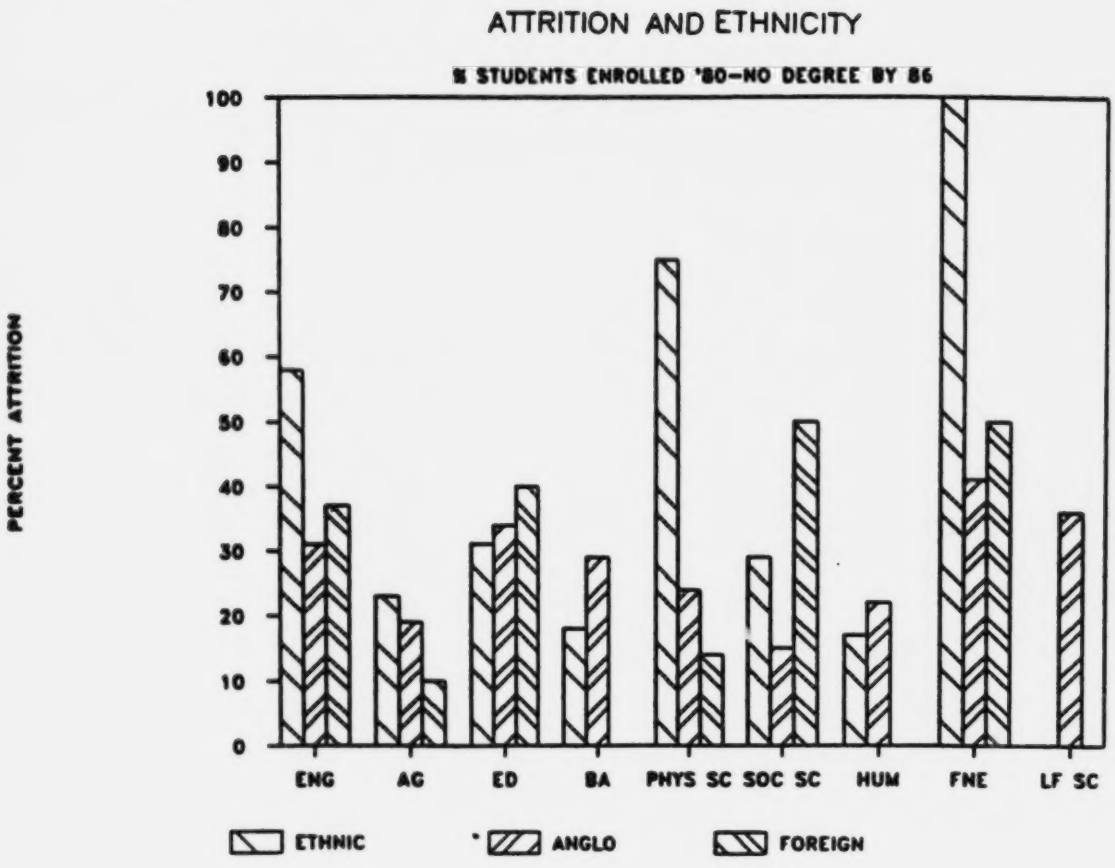
Foreign student enrollment was appreciable in three main areas in this study: engineering, agriculture, and physical sciences (cf. Fig. 1). These areas accounted for 90 percent of the foreign graduate enrollment in the university during the period studied. Attrition among foreign students exceeded the average only in engineering. In Agriculture and the Physical Sciences, attrition among foreign

FIGURE 5.



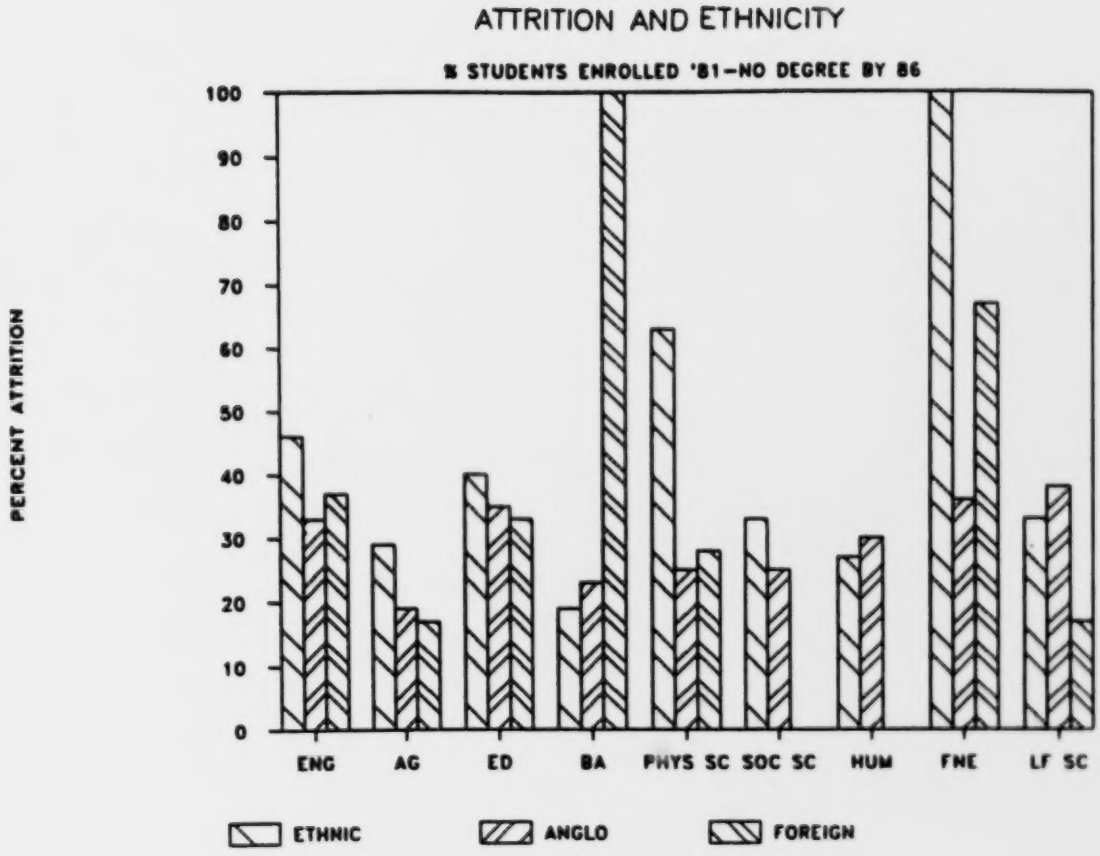
Legend. Attrition as it relates to ethnicity of graduate students enrolled in Fall 1979. The values on the ordinant are percentages of students who had not recieved a master's degree by July of 1986. The disciplinary areas indicated on the abscissa are defined in the legend of Figure 1.

FIGURE 6.



Legend. Attrition as it relates to ethnicity of graduate students enrolled in Fall 1980. The values on the ordinant are percentages of students who had not recieved a master's degree by July of 1986. The disciplinary areas indicated on the abscissa are defined in the legend of Figure 1.

FIGURE 7.



Legend. Attrition as it relates to ethnicity of graduate students enrolled in Fall 1981. The values on the ordinant are percentages of students who had not recieved a master's degree by July of 1986. The disciplinary areas indicated on the abscissa are defined in the legend of Figure 1.

Table 4. Attrition among ethnic students in education

	1979		1980		1981	
	Male	Female	Male	Female	Male	Female
Enrolled[a]	51	80	48	69	34	68
Attrition[b]	20	28	17	19	10	30
Percentage[c]	39	35	35	28	29	44

[a]Total number of student records obtained for the indicated years.

[b]The number of records of students who had not received a graduate degree from the university by July 1986.

[c]The rate of attrition for each group of students.

students was substantially below the average. Table 5 shows the gender distribution of foreign students in these disciplines.

As shown, men outnumbered women by about 15 to 1. From these results one generalization is clear: foreign men in agriculture and physical sciences show very low (about ½ the average) attrition.

In Figures 5, 6, and 7 the Anglo student group showed, by virtue of their numbers, essentially the same trends as those reported in Figures 2, 3, and 4. One exception to this trend was noted when we examined the Anglos in education sorted by gender. These results are shown in Table 6. The ratio of men to women in this group was 3 to 7. Attrition averaged 39.7 percent among men; 31.3 percent among women. Thus, a clear gender effect is apparent which exceeded the effect of ethnicity. Anglo men in education would thus appear to exhibit one of the highest rates of attrition found in a group consisting of appreciable numbers. Students enroll in the education disciplines for a variety of reasons. Pursuit of a graduate degree may be only one of them. A comparison of data in Tables 4 and 6 underscores this assertion. Among ethnics in education, attrition amounted to 36 percent with no gender bias. The level of attrition was considerably higher than the university average of about 30 percent. Among Anglos in education, women exhibited an attrition rate of 31 percent, which was equal to the university average, but Anglo men exhibited an attrition rate of about 40 percent, which was considerably higher than the average for ethnics (36 percent), and much higher than the university average (30 percent).

Table 5. Gender of foreign students in selected disciplinary areas

Area*	1979		1980		1981	
	Male	Female	Male	Female	Male	Female
Engineering	44	2	41	3	67	4
Agriculture & Home Economics	72	3	68	5	73	5
Physical Sciences	25	2	22	4	27	3

*See legend of Figure 1.

Table 6. Attrition among Anglo students in education

	1979		1980		1981	
	Male	Female	Male	Female	Male	Female
Enrolled[a]	119	261	110	210	95	217
Attrition[b]	49	77	44	64	36	74
Percentage[c]	41	30	40	30	38	34

[a]Total number of student records obtained for the indicated years.

[b]The number of records of students who had not received a graduate degree from the university by July 1986.

[c]The rate of attrition for each group of students.

The results presented in Tables 1 through 6 and Figures 2 through 7 permit general conclusions regarding attrition of graduate students in the several disciplines. They suggest that attrition as defined and measured here may vary over fairly wide limits depending upon the discipline, the national origin of the student, the ethnicity of the student, and apparently upon the gender of the student. In an effort to carry the analyses further, we examined the attrition of students by gender, ethnicity, and national origin in each of the major disciplinary areas described in Figure 1. In Appendix Tables A4 through A12 we present results that show the attrition of each demographic group in each of the major disciplinary areas for each of the years in the study. The data in these tables were combined and averaged in an effort to summarize the results and to permit conclusions regarding trends which persist over the three-year period studied.

In Table 7 we present the combined and averaged data for Anglo students who were registered in the fall semesters of the years 1979, 1980, and 1981. The overall rate of attrition for Anglos was about 30 percent (bottom figure, right column). To illustrate the construction of the table, consider the case of the engineering disciplines. Over the three-year period the male enrollment was just over 97 students, or about 87 percent of the Anglo enrollment. During the study period an average of 14 women were enrolled, or about 12 percent of the Anglo enrollment. With regard to attrition, 30 men did not receive degrees during the test period (31 percent). Among female students, just over five (38 percent) did not receive degrees. Just over 35 of 111 Anglo

Table 7. Mean attrition data for the period 1979-1981: Anglo students

Disciplinary Area	Average Enrollment					Average Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	97.30	87	14.0	12	111.0	30.30	31	5.33	38	35.60	32
Agriculture	110.00	70	47.0	29	157.0	19.60	17	10.00	21	29.60	18
Education	109.00	32	230.0	67	339.0	42.60	39	72.0	31	114.00	33
Business Administration	37.00	61	23.3	38	60.3	10.30	27	7.33	31	17.60	29
Physical Sciences	104.00	79	27.3	20	131.0	25.60	24	5.33	19	31.00	23
Social Sciences	47.30	69	20.6	30	68.0	13.00	27	5.33	25	18.30	26
Humanities	17.00	26	48.3	73	65.3	3.66	21	12.00	24	15.60	23
Fine Arts	7.66	30	17.6	69	25.3	3.00	39	6.33	35	9.33	36
Life Sciences	34.00	66	17.3	33	51.3	15.00	44	3.33	19	18.30	35
Interdisciplinary Master's	11.00	62	6.66	37	17.6	2.00	18	0.66	10	2.66	15
Interdisciplinary Doctoral	4.00	60	2.66	40	6.66	1.33	33	0.00	0	1.33	20
Unclassified	23.00	42	31.00	57	54.00	22.30	97	30.30	97	52.60	97
Total	602.00	55	486.00	44	1088.00	189.00	31	158.00	32	347.00	31

students (32 percent of the total) did not receive degrees during the test period.

Several trends regarding Anglo students were apparent from the data presented in Table 7. Students of both sexes in the interdisciplinary master's program exhibited a low rate of attrition. Interdisciplinary students are generally more mature and have well-defined plans for completing their educational goals. Students in agriculture also exhibited low rates of attrition (about 18 percent). Students in the physical sciences showed lower than average attrition at 23 percent, and there may have been a slight gender effect with females showing lower attrition. The highest rates of attrition were seen among men in education (39 percent), and also among men in the life sciences (44 percent). In both cases, a gender effect was apparent with females showing a lower rate of attrition.

An analysis of attrition among foreign students over the study period is presented in Table 8. As was pointed out above, foreign students were concentrated in three main areas, namely, engineering, agriculture, and physical sciences. Also, nearly all were men (Table 5). The ratio of males to females is about 15 to 1. Foreign students showed the highest rates of attrition in engineering (34 percent), and much lower rates in agriculture (15 percent) and the physical sciences (15 percent). Gender effects were impossible to infer since the ratio of men to women was high and the total numbers of women were low.

Attrition among ethnic students during the period studied is summarized in Table 9. The distribution of ethnic students among the disciplines was not uniform. The largest number appeared in education, then in decreasing order, in agriculture, the social

Table 8. Mean attrition data for the period 1979-1981: Foreign students.

Disciplinary Area	Average Enrollment					Average Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	57.00	93	3.66	6	60.60	19.6	34	1.33	36	21.00	34
Agriculture	72.00	93	4.66	6	76.60	11.3	15	0.0	0	11.30	14
Education	5.00	88	0.66	11	5.66	2.0	40	0.66	0	2.66	47
Business Administration	1.66	83	0.33	16	2.00	0.0	0	0.0	0	0.0	0
Physical Sciences	24.60	89	3.00	10	27.60	4.0	16	0.33	11	4.33	15
Social Sciences	1.66	83	0.33	16	2.00	0.66	40	0.0	0	0.66	33
Humanities	0.0	0	1.00	100	1.00	0.0	0	0.0	0	0.0	0
Fine Arts	2.0	75	0.66	25	2.66	1.0	5	0.0	0	1.0	37
Life Sciences	4.0	92	0.33	7	4.33	0.66	16	0.33	100	1.0	23
Interdisciplinary Master's	3.0	0	0.0	0	3.00	0.0	0	0.0	0	0.0	0
Interdisciplinary Doctoral	0.0	0	0.0	0	0.0	0.0	0	0.0	0	0.0	0
Unclassified	1.0	100	0.0	0	1.0	0.66	66	0.0	0	0.66	66
Total	172.0	92	14.6	7	186.0	40.00	23	2.66	18	42.60	22

Table 9. Mean attrition data for the period 1979-1981: Ethnic students

Disciplinary Area	Average Enrollment					Average Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	10.00	90	1.00	9	11.00	5.00	50	0.33	33	5.33	48
Agriculture	10.00	63	5.66	36	15.60	2.66	26	1.33	23	4.00	25
Education	44.00	37	72.30	62	116.00	15.60	35	25.60	35	41.30	35
Business Administration	9.33	87	1.33	12	10.60	1.33	14	0.66	50	2.00	18
Physical Sciences	5.66	77	1.66	22	7.33	4.00	70	1.00	60	5.00	68
Social Sciences	11.30	73	4.00	26	15.30	2.66	23	2.66	66	5.33	34
Humanities	1.66	12	11.60	87	13.30	0.33	20	3.00	25	3.33	25
Fine Arts	1.66	62	1.00	37	2.66	0.66	40	0.66	66	1.33	50
Life Sciences	3.66	84	0.66	15	4.33	0.33	9	0.66	100	1.00	23
Interdisciplinary Master's	0.33	50	0.33	50	0.66	0.33	100	0.00	0	0.33	50
Interdisciplinary Doctoral	0.00	0	0.00	0	0.00	0.00	0	0.00	0	0.00	0
Unclassified	3.66	26	10.30	73	14.00	3.66	100	10.30	100	14.00	100
Total	101.00	47	110.00	52	211.00	36.60	36	46.30	42	83.00	39

sciences, and the humanities. Attrition in the education disciplines for ethnic students was 35 percent. No gender effect was apparent. In agriculture their rate of attrition was 25%, with perhaps a slight gender effect. Attrition in the social sciences was 34 percent, and a gender effect was apparent. In the humanities ethnic attrition was 25 percent with a slight gender effect. In these three areas women showed a slightly higher rate of attrition.

Summary and Conclusions Regarding Attrition

In Table 10 we present the salient results obtained in the analyses of attrition discussed above. If we consider that the average level of attrition for all graduate students in the university was approximately 30 percent, the following generalizations are consistent with the results obtained. The engineering disciplines are characterized by a somewhat elevated level of attrition. However, for Anglo men (31 percent attrition) the level is about average. Recall also that Anglo men constitute almost 50 percent of the total enrollment in engineering. The other groups (Anglo women, ethnics, and foreign students) constitute about 50% of the enrollment, and each group exhibits a higher than average rate of attrition. Anglo women and ethnic men appear to exhibit the highest levels of attrition.

Students in the agricultural disciplines exhibit the lowest levels of attrition observed in this study. Anglo and foreign men constitute roughly 60 percent of the agricultural enrollment. Their rates of attrition are roughly one half the average rate of attrition for the university as a whole. Ethnics in agriculture (constituting less than 10 percent of the total enrollment) exhibit somewhat higher levels of attrition.

Table 10. Summary of attrition rates[a] among the demographic groups in the disciplinary areas studied.

Disciplinary Area	Anglo		Ethnic		Foreign	
	Men	Women	Men	Women	Men	Women
Engineering	31	38	50*	33	34	36
Agriculture	17*	21	26*	23	15*	-
Education	39*	31	35	35	-	-
Business Administration	27	31	14	50	-	-
Physical Sciences	24	19*	70*	60*	16*	-
Social Sciences	27	25	23	66*	-	-
Humanities	21	24	20	25	-	-
Fine Arts	39	35	40	66*	-	-
Life Sciences	44*	19	-	-	-	-
Interdisciplinary Master's	18	10	-	-	-	-
Interdisciplinary Doctoral	33	-	-	-	-	-
Unclassified	97	97	-	-	-	-

[a]Attrition rates equal the number of students not receiving a degree divided by the total number of students in a given category, and are expressed as percentages.

See legend of Figure 1.

*The figures appearing with an asterisk indicate percentages of attrition which are of more than passing interest, and are mentioned specifically in the text. Responses indicated by a dash are those representing very small numbers (cf. Tables A4-12 in the appendix and tables 7, 8, 9).

The education disciplines may show a slight increase over the average attrition. Note, however, that Anglo women (the largest single group) show a level of attrition about equal to the university average. Anglo men show a rate of attrition of nearly 40 percent. As noted above, this finding may reflect the tendency of Anglo men to pursue goals other than graduate degrees in education (i.e., tenure, certification requirements, salary raises linked to accumulation of graduate credit).

In business administration and economics, ethnic women appear to exhibit high levels of attrition, but recall from Figure 1 that they constitute only about 4 percent of the total enrollment. It is likely that there are uncertainties caused by a small sample size.

Students enrolled in the physical sciences are primarily Anglos and foreign students. These groups show a very low rate of attrition. As shown in Figure 1, ethnics constitute a small percentage of the enrollment in physical sciences, and from Table 10 it appears that their attrition is considerably above the average.

In the social sciences, the humanities, and the fine arts there are, by and large, very small numbers of students in each of the demographic categories, so that percentages may be misleading. Ethnic women appear to exhibit high levels of attrition in the social sciences and the Fine Arts.

Anglo men in the Life Sciences appear to exhibit a higher than average rate of attrition. This higher rate could perhaps reflect the fact that many of these men have other objectives such as admission to professional schools in the health sciences. When these men reach

their objective, or when they decide upon another course of action, they terminate their graduate study.

With regard to demographic generalizations, among Anglos the only suggestions of gender bias appear in engineering, education, and life sciences. Among ethnics, gender bias is not apparent in education where the greatest numbers are enrolled. Ethnics as a group appear to exhibit high levels of attrition in the engineering disciplines and in the physical sciences. Foreign students show average attrition rates in engineering, but lower than average rates in the agricultural disciplines and in the physical sciences. The selective procedures for admission of foreign students, coupled with an apparent higher level of motivation, may explain the lower attrition rates that they exhibit as a group.

Estimation of Time Required to Complete a Master's Program

The data and conclusions presented above have focused on the quantitative description of attrition in the various disciplines and among the several demographic groups. We turn now to a description of the students who do complete graduate programs and on whom degrees are actually conferred. The first question regarding this group is "How long does it take for a student to earn a master's degree at this university?"

To obtain an estimate of this time, we sorted our files on the basis of first registration. Thus, we obtained records of all students who registered for the first time in either the fall of 1979, 1980, or 1981. We then selected from this group the records of those students who had earned a master's degree during the interval from the date of first registration to July of 1986. This group of records was then sorted on the basis of gender and finally on the basis of major disciplinary area. The first calculations revealed immediately that the average or mean time required to earn a degree was nearly meaningless because of the extreme range in values obtained. The standard deviation was nearly 100% of the calculated mean (about 25 months) and the spread from low to high was from 9 months to more than 60. From these calculations it became apparent that we would require a more appropriate method of data reduction and presentation in order to make our results understandable.

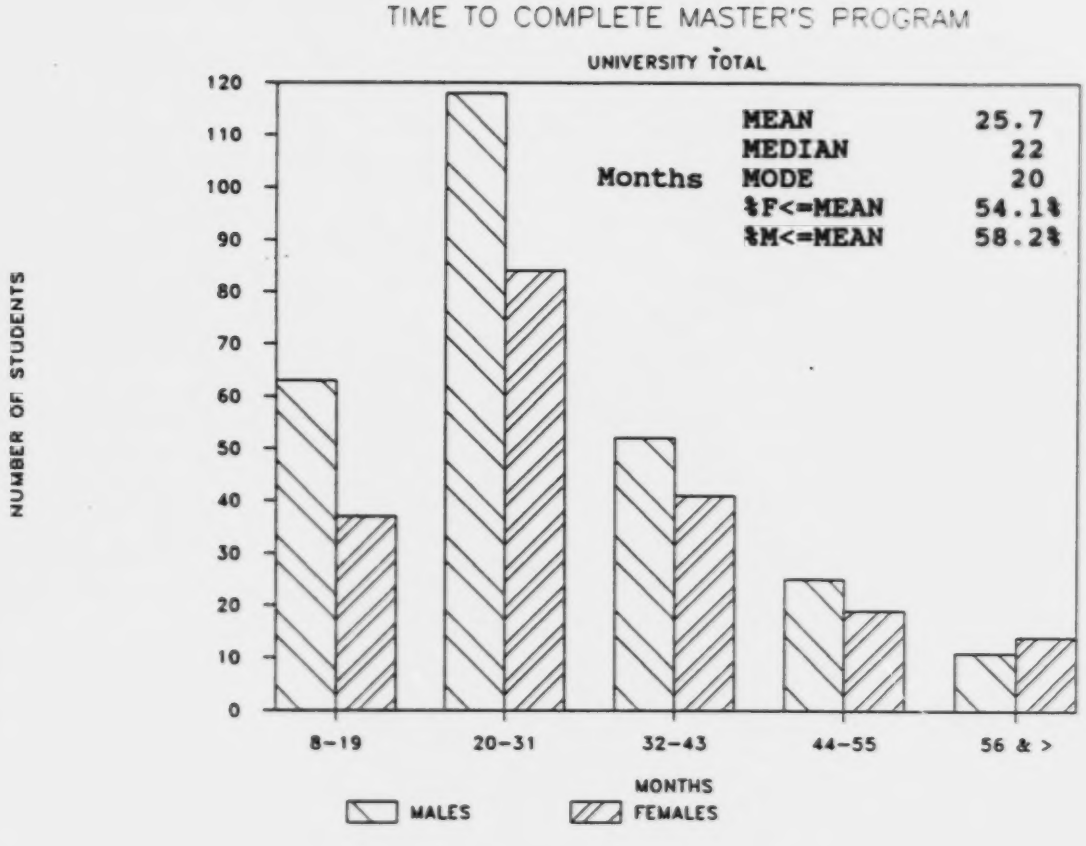
Toward this end we chose the method of presentation indicated in Figure 8. This figure is a histogram in which the number of students (indicated on the ordinant) completing a master's degree within a given time frame (indicated on the abscissa) is shown by the heights

of the coded bars. We also present the mean, the median, and the modal time required for completion, and the percentage of students within the group completing their programs in a time equal to, or less than, the mean time. The results obtained for all the students for whom records were obtained are presented in Figure 8. For this analysis, files were sorted only on the basis of gender. As shown, the mean for the total group is 25.7 months, the median is 22 months, and the modal time is 20 months. In this group 54.1% of the women finished in a time less than or equal to the mean, whereas 58.2% of the men completed their programs within that time frame.

Appendix Figures A1 through A9 present the results obtained when the files were sorted on the basis of the major disciplinary areas (cf. legend to Fig. 1). Figure 9 summarizes some of the data presented in these figures. A higher percentage of males finished their programs in the designated time frame in education, business administration, physical sciences, and the fine arts. For the entire sample, men appeared to have a slight advantage. In the fine arts and the life sciences, the absolute number of students was small so percentages must be interpreted accordingly.

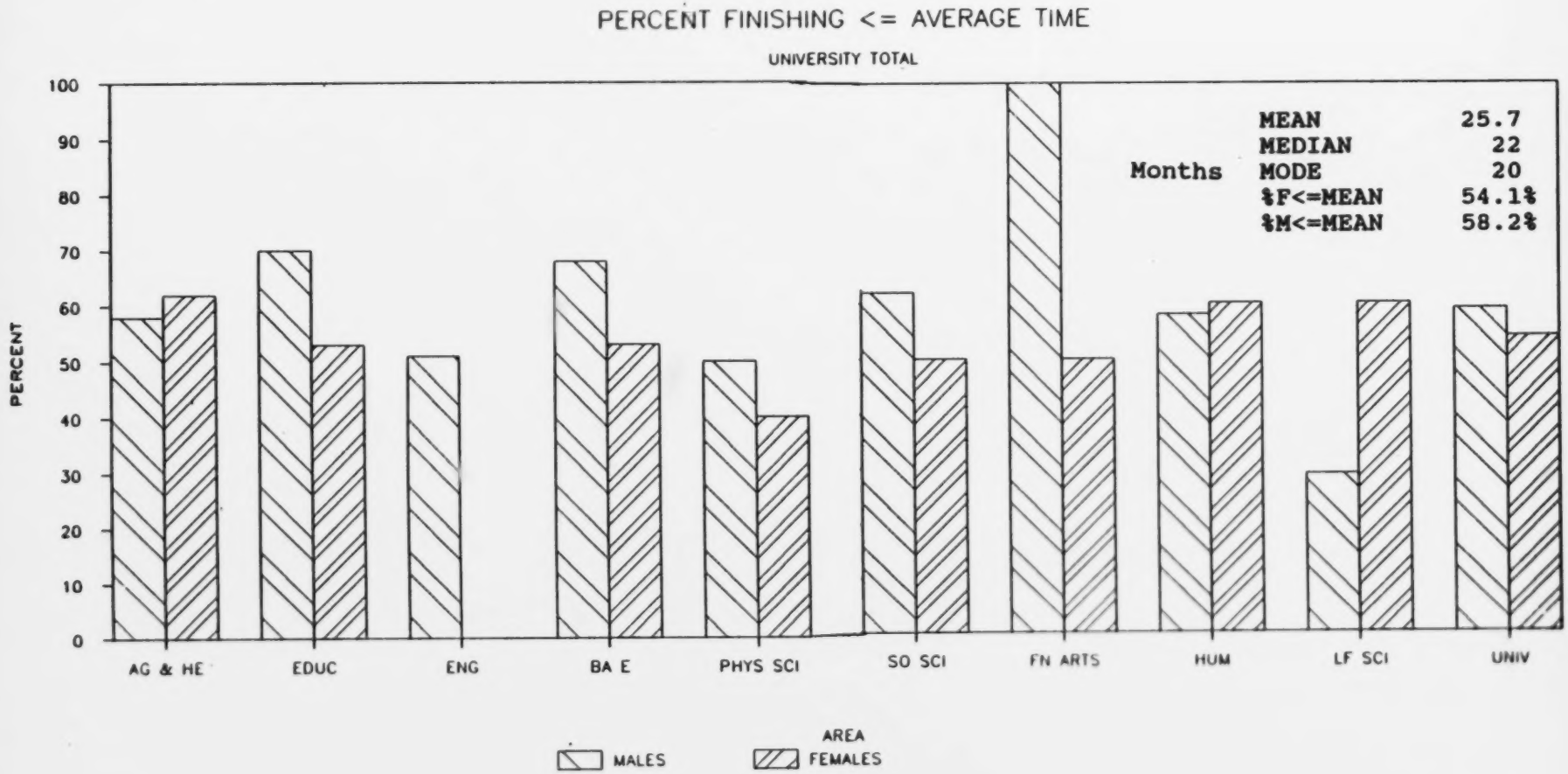
In agriculture, engineering, education, social sciences, and humanities the mean time for students to complete was not different from the overall mean for all students. Students in business administration and the fine arts appeared to require slightly less time. Students in the physical sciences and life sciences required a slightly longer time for completion. In almost all areas, and certainly for the university as a whole, considerably more than half

FIGURE 8.



Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

FIGURE 9.



Legend. The heights of the bars indicate the percentage of each gender completing in a time less than or equal to the mean time. The data upon which this plot is based are presented in Appendix Figures 1 through 9.

of all students finished their programs in the designated time frame, which in almost all areas occurs between 20 and 31 months.

We had thought that in areas with a relatively high proportion of part-time students (e.g., education) this method of data presentation would exhibit a "skewing" effect, such that an obviously larger proportion of students' records would appear in the time frames of longer duration. The expected skewing was seen among women in education, but not among men (Appendix Figure A2). One explanation might be that a fair number of male part-time students do not appear in these data for the reason (see above) that they never intended to complete a degree, but instead sought only graduate credit required for certification or salary consideration (cf. Table 10).

As shown in Table 11, the overall mean, median, and modal times to complete a master's program were, respectively, 25.7, 22 and 20 months. Disciplinary areas in which students appeared to require longer times were physical sciences, engineering, and life sciences. Students in business administration and economics and fine arts required shorter times. Table 11 also indicates percentages of men and women who finished their programs in times equal to or less than the mean time for students in the discipline. These percentages are presented graphically in Figure 9.

We attempted to sort on the basis of full-time or part-time enrollment in an effort to reduce the spread in the calculated mean time to completion. Although the definition of a full-time graduate student is well understood and easily stated, it was impossible to perform a meaningful partition of the data because of individual variation in enrollment (i.e., students are full time for some

Table 11. Various measures of the time required to complete programs leading to the master's degree in the major disciplinary areas represented at New Mexico State University.*

	Months to completion of degree program			Percentage of students finishing programs in a time less than or equal to the mean	
Disciplinary Area[a]	Mean	Median	Mode	Males	Females
Agriculture & Home Economics	26.4	22	20	58.3	61.9
Education	26.1	22	20	70.0	61.4
Engineering	27.7	28	28	51.9	-
Business Admin. & Economics	23.4	20	16	68.4	53.3
Physical Sciences	31.5	32	20	50	40.0
Social Sciences	27.6	22	20	39.4	50.0
Fine Arts	22.2	20	20	100.0	58.3
Humanities	28.8	22	20	58.3	59.5
Life Sciences	30.2	36	36	28.6	60.0
All University	25.7	22	20	58.2	54.1

The figures in the right-hand columns indicate the percentages of men and women finishing master's programs in times equal to or less than the mean time to completion for the indicated disciplinary area. These data are plotted in the histogram of Figure 9.

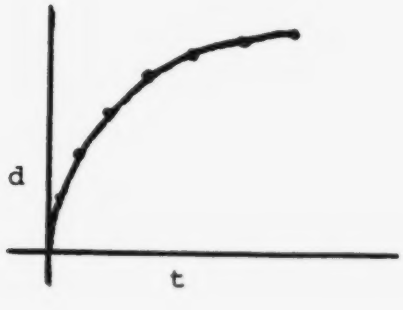
[a]See Figure 1.

*These population parameters were calculated from the data presented in Figure 8 and Appendix Figures A1 through A9.

semesters, part time for others). One approach to this problem was to sort on the basis of national origin, since all foreign students are required by policy to be enrolled "full time" (9 credits per semester) in a program leading to a degree. The data obtained by this sort produced the expected results. The mean, median, and mode were tightly clustered; the range from low to high was much narrower; and the standard deviation about the mean was about one-third the value previously observed. It became apparent very quickly that the only general statements that could be made about the progression of full-time students as compared with that of part-time students were those that belabored the obvious: i.e., other things being equal, full-time students require less time to complete their programs than part-time students. From these analyses it appears that students require about two calendar years to complete a master's program at this university. Some students complete in less than one year, and others take as long as five years to complete.

Rate of Conferral of Degrees

The rate at which degrees are conferred on a population of students is a characteristic that describes the group rather than the individuals in the group. To estimate this characteristic, we sorted the three populations of students, first on the basis of those who had received either a master's degree or a doctoral degree. We then listed the recipients of each degree in the order in which they received their respective degrees. The master's people were listed in one group. The doctoral people were listed in a second group. The order in which the names appeared on the lists ignored the length of time for which the individuals had been enrolled prior to the fall semesters of the years 1979, 1980, and 1981. The order was determined only by the time that elapsed from the indicated semester of enrollment to the date of degree conferral. The cumulative number of degrees was plotted as a function of the months of elapsed time between the beginning of the indicated fall semester and the date of degree conferral. The general form of such plots is shown in the following diagram:



Such plots exhibited, to a first approximation, the form of a rectangular hyperbola. The equation of such a curve may be written as follows:

$$d = D_{max} \cdot \frac{t}{t + t_{\frac{1}{2}\,max}} \qquad (1)$$

where

d = number of degrees at any given time

D_{max} = the theoretical maximum number of degrees ever to be conferred on a group of students

t = the number of months of elapsed time

$t_{\frac{1}{2}max}$ = the number of months required to reach $\frac{1}{2}\, D_{max}$

As is intuitively apparent, D_{max} is easily defined, but neither practically attainable nor empirically observable. It is the theoretically maximal number of degrees that could be granted to a group of students if they were permitted an infinite amount of time to complete the requirements. Notice from equation (1) that as t increases, $t_{\frac{1}{2}max}$ becomes quantitatively less important, and that eventually the expression $t/(t + t_{\frac{1}{2}max})$ will equal unity and d will

have achieved its maximal value, or D_{max}. At that point the slope of the curve will be zero, the maximal number of degrees will have been conferred, and d will equal D_{max}. In such a system the time required to grant 1/2 the maximum number of degrees ($t_{½max}$) is a characteristic of the population of students. If other conditions (e.g., policies, criteria for admission, and rigor of programs) remain constant, this statistic gives information about the rate at which students as a group pass through the programs of the Graduate School. But, because D_{max} may not be empirically determined it becomes impossible to determine directly the time at which ½ D_{max} is attained. This problem is formally similar to one faced by biochemists in their attempt to describe kinetic characteristics of chemical reactions catalyzed by enzymes. As was shown by Lineweaver and Burk (2) many years ago, equation (1) may be converted to a linear form by simply taking the reciprocal of both sides. Equation (1) then becomes

$$\frac{1}{d} = \frac{1}{D_{max}} + \frac{t_{½max}}{D_{max}} \cdot \frac{1}{t} \qquad (2)$$

where

$\frac{1}{d}$ = reciprocal of the number of degrees degrees conferred

$\frac{1}{D_{max}}$ = reciprocal of the theoretical maximum number of degrees to be conferred

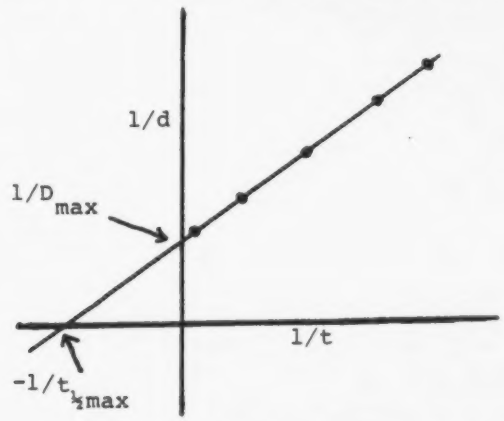
$t_{½max}$ = time required to reach 1/2 the maximum number of degrees divided by the theoretical maximum number of degrees

$\frac{1}{t}$ = reciprocal of the number of months of elapsed time

Equation (2) is now in the general form:

$$y = mx + b, \qquad (3)$$

which is the equation of a straight line. In the case of equation (2), the slope of the line is $t_{\frac{1}{2}max}/D_{max}$. When 1/t is ∿ zero (at very large values of t), then from equation (2) it is clear that 1/d equals $1/D_{max}$. Thus, the value of D_{max} may be obtained by extrapolation from the data available, even though it is not directly observable. Similarly, the time required to reach $t_{\frac{1}{2}max}$ may be inferred from equation (2) to be the reciprocal of the abscissal intercept in quadrant 1. The following diagram illustrates these statements:



Appendix Figures A10 through A27 present plots of the data obtained from this type of analysis for males and females of the three major cohorts of graduate students. Appendix Figures A10 through A18 depict conferral of master's degrees. Appendix Figures A19 through A27 show conferrals of doctoral degrees. The data points are indicated on the figures and were connected by smooth curves. These curves were assumed to be sections of rectangular hyperbolas. The double reciprocal plots shown in the insets were constructed from arbitrarily selected points on the smooth curves rather than from the prime data. The student cohorts were subdivided by gender, and a separate plot was made for the total cohort and for males and females within the cohort. Table 12 presents a summary of the population

Table 12. Conferral* of master's degrees on populations of graduate students.

Cohort	Actual[a] Degrees Granted	Theoretical[b] Maximum	$t_{\frac{1}{2}max}$[c]	$\frac{\text{Actual}}{\text{Theoretical}}$[d]
1979 All students	740	1128	26.1	0.66
1979 Males	421	630	24.5	0.67
1979 Females	329	524	29.5	0.63
1980 All students	729	1066	22.9	0.68
1980 Males	431	626	21.5	0.69
1980 Females	298	445	25.8	0.67
1981 All students	736	1060	22.4	0.69
1981 Males	424	605	21.0	0.70
1981 Females	312	456	24.7	0.68

All students: Average $t_{\frac{1}{2}max}$ = 23.8 months Average $\frac{\text{Actual}}{\text{Theoretical}}$ = 0.68

Males: Average $t_{\frac{1}{2}max}$ = 22.3 months Average $\frac{\text{Actual}}{\text{Theoretical}}$ = 0.69

Females: Average $t_{\frac{1}{2}max}$ = 26.7 months Average $\frac{\text{Actual}}{\text{Theoretical}}$ = 0.66

[a] measured number of degrees conferred.

[b] maximum number of degrees that could be conferred in an infinite period of time.

[c] the number of months required to reach 1/2 the theoretical maximum number of degree conferrals.

[d] fraction of the maximum number of degree conferrals that was actually attained during the period under study.

* The population parameters presented in this table were calculated from data presented in Appendix Figures A10 through A18.

parameters derived from these analyses for the conferral of master's degrees. For each year of this study we show the results for all students in the particular cohort, and for males and females. In all three cohorts, women appear as a group to require more time to pass through the system. As shown, we observed a four- to five-month spread in terms of the time required to confer one-half the maximum number of degrees that could theoretically be granted. In all cases, the half time for men was shorter. It was of some interest to note that the values calculated for actual/theoretical conferrals were in essential agreement with those for attrition that were calculated from the data presented in Tables 1 through 7 (i.e., we attain about 70% of theoretical maximum).

The same types of analyses were performed on those students in each of the cohorts who went on to complete doctoral degrees within the period under study. The plots of these data are presented in Appendix Figures A10 through A18. The results are summarized in Table 13. Smaller numbers of students were involved and, therefore, the correlation coefficients of the regression analyses were not quite so high. Nevertheless, they were sufficiently high to lend some credibility to the inferences drawn. It is clear, as was expected, that the half-time for conferral of doctoral degrees was considerably longer than that required for master's degrees. It was of some interest and perhaps significance that the gender effect observed in the groups receiving master's degrees was essentially absent in the doctoral groups. Doctoral-level students, by virtue of selective processes, might be expected to exhibit more homogeneity with respect to ability, perseverance, and commitment. They might, therefore, be

expected to move through the system as a single group, irrespective of gender. Overall attrition as measured by the "actual/theoretical" calculation employed in this analysis was almost identical with the values presented in Tables 1 through 7. In this connection it was of interest to note that the sums of the theoretical maxima accounted for 0.95 degrees per student for the records from 1979 and 1980, and for 0.99 degrees per student for the records from 1981.

As was mentioned, these analyses were performed on data obtained from sorts that disregarded any prior enrollment of individual students. We simply plotted the time course of conferral of degrees on a given population of students. A question concerning the propriety of this approach raised the issue of prior enrollment of individuals and the effect of this variable on the results and conclusions. We, therefore, conducted a further analysis using data obtained from student records of those whose first enrollment occurred either in the fall of 1979, 1980, or 1981. Thus, the cumulative number of conferrals was plotted as a function of time from the date of first enrollment. These plots were analyzed in the same manner as those described above. The results and conclusions regarding half times were essentially the same as those presented in Tables 12 and 13.

Table 13. Conferral* of doctoral degrees on populations of graduate students.

Cohort	Actual[a] Degrees Granted	Theoretical[b] Maximum	$t_{\frac{1}{2}max}$[c]	$\frac{\text{Actual}}{\text{Theoretical}}$[d]
1979 All students	162	237	35.9	0.68
1979 Males	112	160	33.5	0.70
1979 Females	50	71	31.5	0.71
1980 All students	171	266	45.7	0.64
1980 Males	124	188	41.5	0.66
1980 Females	47	74	46.9	0.64
1981 All students	190	312	44.3	0.61
1981 Males	138	225	43.8	0.61
1981 Females	52	87	45.7	0.60

All students: Average $t_{\frac{1}{2}max}$ = 42.0 months Average $\frac{\text{Actual}}{\text{Theoretical}}$ = 0.64

Males: Average $t_{\frac{1}{2}max}$ = 39.6 months Average $\frac{\text{Actual}}{\text{Theoretical}}$ = 0.66

Females: Average $t_{\frac{1}{2}max}$ = 42.6 months Average $\frac{\text{Actual}}{\text{Theoretical}}$ = 0.65

[a] measured number of degrees conferred.

[b] maximum number of degrees that could be conferred in an infinite period of time.

[c] the number of months required to reach 1/2 the theoretical maximum number of degree conferrals.

[d] fraction of the maximum number of degree conferrals that was actually attained during the period under study.

* The population parameters presented in this table were calculated from the data presented in Appendix Figures 19 through 27.

Discussion of the Major Findings

This study was carried out to answer questions such as, "I wonder how many graduate students we lose?" Related questions generally concerned whether women or ethnic minorities were at a disadvantage in terms of attrition. To approach the answers to these questions we first had to obtain the raw information from the Computer Center. We were obliged to restrict our study to those graduate students who were enrolled in the Graduate School in the fall semesters of the academic years 1979, 1980, and 1981. Data for other fall semesters on either side of this three-year time frame were not and are not readily available.

The major findings of this study may be summarized as follows:

1. Overall attrition in our graduate programs amounts to 30%
   a. We find almost no gender bias when considering the entire graduate student body.
   b We do find a clear effect related to ethnicity. Students identifying themselves as ethnics exhibit higher levels of attrition.
2. The engineering disciplines are characterized by a somewhat higher level of attrition. This elevated level is attributable to Anglo women, ethnics, and foreign students who constitute about 50% of the engineering enrollment. Each of these groups exhibits a significantly higher than average attrition.
3. Students in the agricultural disciplines exhibit the lowest levels of attrition observed in this study.

4. The education disciplines show a slight increase over the average level of attrition. Anglo men show a dramatic increase over the average level of attrition and account for the slight overall increase.
5. The students enrolled in the physical sciences are primarily Anglos and foreign students. Ethnics constitute a small percentage of the total, but their level of attrition is considerably above the average.
6. Anglo men in the life sciences appear to exhibit a higher than average level of attrition.
7. Among Anglos, the only gender bias appears to favor men in engineering and women in education and the life sciences.
8. Ethnics show a higher level of attrition in the engineering disciplines and in the physical sciences.
9. Foreign students show average attrition levels in engineering, but lower than average levels in agriculture and the physical sciences.
10. The mean, median, and modal times that students required to complete a master's program were 25.7, 22, and 20 months, respectively.
11. Students required somewhat more time to complete programs in engineering (28 months), physical sciences (32 months), and the life sciences (36 months).
12. A method for describing the rate of conferral of degrees on a population of students was devised. The results, expressed in terms of the time required to grant half the maximum number of degrees to a group of students, show a

slight gender bias favoring men at the master's level. No gender bias appears at the doctoral level.

We had to decide on an operational definition for our use of the term "attrition." For this purpose we used as the criteria for attrition: enrollment in the fall semesters of 1979, 1980, or 1981, and no graduate degree received during the period from the beginning of the fall semester of 1979 to July 1, 1986. As was pointed out above, this criterion is quite arbitrary and should not be confused with, or equated to, academic failure. Table 10 summarizes the results obtained when this criterion was applied to students in various demographic categories enrolled in the several major disciplinary areas represented among our graduate programs. Although there were several instances of apparent gender bias in the results summarized in Table 10, it is clear that no pervasive trend exists that would suggest that women as a group are overrepresented in terms of attrition. Ethnics appear to appear to exhibit higher levels of attrition than other groups.

Derivative questions arose during the course of this study regarding the length of time required by individuals to complete graduate programs at this university. At first glance, this question seemed simple enough. However, it soon became apparent that several variables involved (e.g., gender, discipline, full-time or part-time enrollment) introduced factors that caused very large differences between minimal and maximal times to completion. Typically, for any group of students those times would range from 9 months to more than 60 months. Means, medians, and modal times were calculated and are summarized in Table 11. In general, students in engineering, the

physical sciences, and the life sciences seemed to require more time for completion of master's programs. Overall, women appeared to be at a slight disadvantage in that a somewhat smaller percentage of them finished their programs in times equal to or less than the average time for the particular discipline. This finding may reflect the fact that women frequently have more demands placed on them (families, career, children, other interests) for time, attention, and energy than do men.

In an effort to devise a method for describing a population of students, we measured the time course or rate at which degrees were conferred on a large group of students. Plots presenting the results of these measurements resembled rectangular hyperbolas. From these plots, it was possible to infer the theoretical maximum number of degree conferrals for a particular group of students, and from this, the time in months required to grant one-half the maximum number of degrees. The results of these calculations are presented and summarized in Tables 12 and 13. From these calculations, it appeared that men as a group proceeded through master's programs somewhat more rapidly than women. The difference was not large (i.e., 15 to 20 percent), but was apparent in all three graduate student cohorts employed in this study. It was of some interest to note that the gender difference seen in master's recipients was not seen in groups consisting of doctoral degree recipients. Selective processes operating on doctoral candidates may serve to make this group more homogeneous. It was also of interest to note that this approach gave values for attrition that were essentially the same as those discussed above. It was also of interest and significance to note

that the extrapolated values for the maximum number of degrees gave values very close to one degree per student.

This study has provided satisfactory answers to the questions originally posed. The methods employed may prove to be of general interest and applicability to studies of attrition and related matters among graduate students. If the appropriate data could be made available on a continuing and reliable basis, the analyses described here could provide useful information for monitoring and describing progress through graduate programs. Such results plotted over a time frame of several years might be useful for detecting subtle changes in student populations, and for suggesting changes in policy governing graduate programs.

A follow-on study of individuals using personal interviews or questionnaires could provide evidence regarding the causes of the trends noted in this study.

REFERENCES

1. REFLEX. The analytic database system. 1985. Borland/Analytica Inc. 4585 Scotts Valley Drive, Scotts Valley, California 95066.

2. Lineweaver, H., & D Burk. JACS 56:658, 1934.

ADDITIONAL DATA

Appendix Table A1. Fall Semester 1979 Enrollment

Department	Level I				Level II				Level III				Level IV				Unclassified				Grand Total
	Full Time		Part Time		Full Time		Part Time		Full Time		Part Time		Full Time		Part Time		Full Time		Part Time		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Ag. Econ./Econ.	20	11	9	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41
Ag. & Ext. Educ.	8	0	7	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19
Agronomy	25	3	8	3	--	--	--	--	6	2	1	0	2	0	0	0	--	--	--	--	50
Animal & Range Sci.	38	3	9	3	--	--	--	--	10	1	0	1	6	1	2	0	--	--	--	--	74
Art	6	11	2	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22
Astronomy	3	1	0	0	--	--	--	--	5	0	3	0	3	0	2	0	--	--	--	--	17
Biology	23	8	11	5	--	--	--	--	9	2	1	2	2	2	2	0	--	--	--	--	67
Business Admin. (MBA)	15	11	19	9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54
Chemical Engrg.	9	0	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17
Chemistry	15	5	3	0	--	--	--	--	6	0	1	0	3	2	5	0	--	--	--	--	40
Civil Engrg.	17	3	6	3	--	--	--	--	1	0	1	0	1	0	1	0	--	--	--	--	33
Computer Sci.	12	6	10	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32
Couns. & Ed. Psych.	12	20	16	28	1	1	2	7	7	6	4	4	0	0	2	1	--	--	--	--	111
Curriculum & Instruct.	9	6	11	47	1	1	1	6	2	6	2	6	2	0	6	1	--	--	--	--	107
Educ. Mgt. & Dev.	13	8	23	24	2	0	9	12	6	11	11	9	0	1	4	3	--	--	--	--	136
Educ. Specialties	5	11	5	45	1	1	1	6	4	12	1	3	2	1	1	2	--	--	--	--	101
Elec. & Compt. Engrg.	23	4	15	1	--	--	--	---	7	1	2	0	3	1	0	0	--	--	--	--	57
English	2	4	1	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12
Government	9	4	9	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	29
History	4	3	4	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14
Home Economics	0	6	0	15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21
Horticulture	11	3	4	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22
IDOC -- (Physics)	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	--	--	--	--	1
IMAS -- (Pest Mgt.)	1	0	2	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3
IMAS -- (AIED)	0	0	1	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
IMAS -- (Hort.)	1	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
IMAS -- (Management)	1	2	0	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4
IMAS -- (Physics)	0	1	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Industrial Engrg.	11	0	11	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23
Mathematical Sciences	12	3	2	0	--	--	--	--	4	1	1	1	2	1	0	0	--	--	--	--	27
Mechanical Engrg.	17	2	6	0	--	--	--	--	3	0	0	0	1	0	2	0	--	--	--	--	31
Music	3	1	1	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5
Physics	12	1	1	0	--	--	--	--	5	0	2	0	4	0	6	1	--	--	--	--	32
Psychology	11	5	4	0	--	--	--	--	2	0	1	0	1	1	0	2	--	--	--	--	27
Sociology	1	6	2	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12
Spanish	1	9	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10
Speech	3	23	1	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	31
Wildlife Science	16	1	6	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23
Unclassified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	5	27	49	87
TOTAL	369	185	216	224	5	3	13	31	77	42	31	26	33	10	33	10	6	5	27	49	1396

Appendix Table A2. Fall Semester 1980 Enrollment

Department	Level I Full Time M	Level I Full Time F	Level I Part Time M	Level I Part Time F	Level II Full Time M	Level II Full Time F	Level II Part Time M	Level II Part Time F	Level III Full Time M	Level III Full Time F	Level III Part Time M	Level III Part Time F	Level IV Full Time M	Level IV Full Time F	Level IV Part Time M	Level IV Part Time F	Unclassified Full Time M	Unclassified Full Time F	Unclassified Part Time M	Unclassified Part Time F	Grand Total	* Number Foreign Students
Ag. Econ./Econ.	36	11	4	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53	21
Ag. & Ext. Educ.	3	1	5	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10	3
Agronomy	26	3	7	3	--	--	--	--	6	3	1	0	3	0	0	0	--	--	--	--	52	20
Animal & Range Sci.	35	5	13	2	--	--	--	--	11	0	0	1	1	0	3	0	--	--	--	--	71	26
Art	6	9	1	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23	3
Astronomy	6	0	0	0	--	--	--	--	5	0	0	0	3	0	3	0	--	--	--	--	17	1
Biology	21	7	8	1	--	--	--	--	7	6	1	3	1	1	2	0	--	--	--	--	58	4
Business Admin. (MBA)	31	11	15	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	68	1
Chemical Engrg.	12	0	7	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20	7
Chemistry	15	4	2	0	--	--	--	--	5	0	3	0	3	1	4	0	--	--	--	--	37	9
Civil Engrg.	13	0	2	3	--	--	--	--	2	0	4	1	0	0	1	0	--	--	--	--	26	10
Computer Science	13	7	5	3	--	--	--	--	1	1	0	0	0	0	0	0	--	--	--	--	30	9
Couns. & Ed. Psych.	14	19	9	23	2	0	2	3	11	9	1	5	0	0	2	2	--	--	--	--	102	1
Curriculum & Instruct.	7	6	11	35	1	0	1	4	1	7	1	2	1	0	5	0	--	--	--	--	82	3
Educ. Mgt. & Dev.	12	8	21	16	0	2	6	6	9	5	8	10	2	3	3	6	--	--	--	--	117	2
Educ. Specialties	5	12	13	68	1	0	2	6	6	14	3	2	1	2	4	3	--	--	--	--	142	0
Elec. & Compt. Engrg.	39	5	9	1	--	--	--	--	7	0	2	0	2	0	1	1	--	--	--	--	67	21
English	3	5	1	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	1
Geology	3	3	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	0
Government	12	4	8	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30	2
History	6	4	4	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20	0
Home Economics	0	5	0	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12	0
Horticulture	7	2	4	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17	6
IDOC	--	--	--	--	--	--	--	--	1	0	1	1	0	0	1	0	--	--	--	--	4	0
IMAS	2	5	5	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14	0
Industrial Engrg.	16	1	11	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30	12
Mathematical Sciences	10	1	4	0	--	--	--	--	6	2	0	0	2	1	0	0	--	--	--	--	26	5
Mechanical Engrg.	16	1	9	2	--	--	--	--	4	0	1	0	1	0	0	0	--	--	--	--	34	12
Music	3	3	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9	0
Physics	9	1	3	0	--	--	--	--	3	1	4	1	7	0	4	0	--	--	--	--	33	3
Psychology	12	1	2	3	--	--	--	--	3	1	1	0	1	1	0	1	--	--	--	--	26	0
Sociology	2	3	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9	0
Spanish (For. Lang.)	0	7	1	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8	1
Speech	2	21	0	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	31	0
Wildlife Science	14	3	11	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28	4
Unclassified	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21	26	14	19	82	0
TOTAL	411	178	199	227	4	2	11	19	88	49	31	26	28	9	33	11	21	28	14	19	1410	187

*Foreign students included in grand total

Appendix Table A3. Fall Semester 1981 Enrollment

	Level I				Level II				Level III				Level IV				Unclassified					
	Full Time		Part Time		Full Time		Part Time		Full Time		Part Time		Full Time		Part Time		Full Time		Part Time		Grand Total	Number Foreign Students*
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Accounting	2	4	3	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	0
Ag. Econ/Econ	35	8	9	2	--	--	--	--	--	--	--	--	—	--	--	--	--	--	--	--	54	13
Ag. & Ext. Educ	6	2	10	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19	9
Agronomy	19	3	7	3	--	--	--	--	13	0	1	1	2	0	3	1	--	--	--	--	53	25
Animal & Range Sci.	30	6	8	3	--	—	--	--	16	0	2	3	2	0	0	0	--	--	--	--	70	30
Art	8	12	0	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22	6
Astronomy	3	1	0	0	--	—	--	--	4	0	0	0	2	0	5	0	--	--	--	--	15	1
Biology	20	11	8	2	--	--	--	--	8	7	2	3	1	0	1	1	--	--	--	--	64	9
Business Admin (MBA)	31	18	18	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	77	6
Chemical Engrg.	12	3	9	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24	9
Chemistry	12	8	2	0	—	--	--	--	14	3	1	0	1	1	4	0	--	--	--	--	46	11
Civil Engrg.	19	2	7	2	--	--	--	--	6	1	4	0	2	0	1	0	--	--	--	--	44	19
Computer Science	19	8	9	7	--	—	--	--	1	1	1	0	0	0	0	0	--	--	--	--	46	10
Couns. & Ed. Psych.	12	20	8	17	0	0	1	1	5	10	5	2	0	1	2	2	--	--	--	--	86	2
Curriculum & Instruct.	6	12	9	32	0	0	0	2	2	9	3	9	0	0	0	2	--	--	--	--	86	0
Educ. Mgt. & Dev.	8	11	8	14	1	1	5	5	12	6	11	10	1	4	5	3	--	--	--	--	105	4
Educ. Specialties	1	11	6	61	0	0	0	4	6	7	1	3	2	5	4	5	--	--	--	--	118	2
Elec. & Compt. Engrg.	38	2	5	1	--	--	--	--	6	0	4	0	2	0	2	1	--	--	--	--	61	25
English	7	6	2	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28	0
Geology	8	5	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15	2
Government	12	6	4	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	27	1
History	7	2	2	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15	0
Home Economics	1	2	0	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9	0
Horticulture	8	0	3	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17	6
IDVC	--	--	--	--	--	--	--	--	1	0	0	0	0	1	1	0	--	--	--	--	3	0
IMAS	3	3	3	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12	1
Industrial Engrg.	11	1	9	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23	8
Mathematical Sciences	11	2	3	1	--	--	--	--	6	0	1	0	3	1	0	0	--	--	--	--	28	7
Mechanical Engrg.	15	2	11	1	--	--	--	--	7	0	2	0	1	0	1	0	--	--	--	--	40	15
Music	5	4	2	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15	0
Physics	6	1	2	0	--	--	--	--	4	1	1	1	5	0	4	1	--	--	--	--	24	2
Psychology	14	7	3	1	--	--	--	--	3	2	0	1	0	0	2	0	--	--	--	--	33	0
Sociology	4	2	3	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11	0
Spanish (For. Lang.)	1	4	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7	1
Speech	3	21	0	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	31	0
Wildlife Science	12	6	7	0	--	--	--	-	--	--	--	--	--	--	--	--	--	--	--	--	25	4
Unclassified	--	--	--	--	--	--	--	-	--	--	--	--	--	--	--	--	11	14	24	41	92	2
TOTAL	411	216	182	214	1	1	6	12	116	67	19	31	24	13	37	16	11	14	24	41	1458	232

*Foreign students is based in grand total

Appendix Table A4. Attrition among the demographic groups in the several disciplinary areas: Anglo students enrolled in Fall 1979.

Disciplinary Area	Enrollment					Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	103	87	15	12	118	34	33	7	46	41	34
Agriculture	112	67	55	32	167	22	19	11	20	33	19
Education	119	31	261	68	380	48	40	78	29	126	33
Business Administration	34	65	18	34	52	12	35	8	44	20	38
Physical Sciences	104	79	27	20	131	22	21	6	22	28	21
Social Sciences	53	69	23	30	76	15	28	7	30	22	28
Humanities	15	25	44	74	59	2	13	10	22	12	20
Fine Arts	6	31	13	68	19	2	33	4	30	6	31
Life Sciences	43	70	18	29	61	16	37	4	22	20	32
Interdisciplinary Master's	11	64	6	35	17	2	18	0	0	2	11
Interdisciplinary Doctoral	3	60	2	40	5	1	33	0	0	1	20
Unclassified	24	43	31	56	55	24	100	30	96	54	98
Total	627	55	513	45	1140	200	31	165	32	365	32

Appendix Table A5. Attrition among the demographic groups in the several disciplinary areas: Foreign students enrolled in Fall 1979.

Disciplinary Area	Enrollment					Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	51	94	3	5	54	17	33	2	66	19	35
Agriculture	72	96	3	4	75	12	16	0	0	12	16
Education	3	75	1	25	4	2	66	1	100	3	75
Business Administration	1	100	0	0	1	0	0	0	0	0	0
Physical Sciences	25	92	2	7	27	3	12	0	0	3	11
Social Sciences	1	50	1	50	2	1	100	0	0	1	50
Humanities	0	0	1	100	1	0	0	0	0	0	0
Fine Arts	2	66	1	33	3	0	0	0	0	0	0
Life Sciences	4	80	1	20	5	1	25	1	100	2	4
Interdisciplinary Master's	3	100	0	0	3	0	0	0	0	0	0
Interdisciplinary Doctoral	0	0	0	0	0	0	0	0	0	0	0
Unclassified	0	0	0	0	0	0	0	0	0	0	0
Total	162	92	13	7	175	36	22	4	30	40	22

Appendix Table A6. Attrition among the demographic groups in the several disciplinary areas: Ethnic students enrolled in Fall 1979.

Disciplinary Area	Enrollment					Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	7	100	0	0	7	3	42	0	0	3	42
Agriculture	10	66	5	33	15	2	20	1	20	3	20
Education	51	38	80	61	131	20	39	28	35	48	36
Business Administration	5	100	0	0	5	1	20	0	0	1	20
Physical Sciences	4	100	0	0	4	4	100	0	0	4	100
Social Sciences	11	73	4	26	15	4	36	3	75	7	46
Humanities	1	8	11	91	12	1	100	3	27	4	33
Fine Arts	2	66	1	33	3	0	0	0	0	0	0
Life Sciences	4	100	0	0	4	1	25	0	0	1	25
Interdisciplinary Master's	0	0	0	0	0	0	0	0	0	0	0
Interdisciplinary Doctoral	0	0	0	0	0	0	0	0	0	0	0
Unclassified	2	16	10	83	12	2	100	10	100	12	100
Total	97	46	111	53	208	38	39	45	40	83	39

Appendix Table A7. Attrition among the demographic groups in the several disciplinary areas: Anglo students enrolled in Fall 1980.

Disciplinary Area	Enrollment					Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	94	86	15	13	109	25	26	7	46	32	29
Agriculture	116	72	43	27	159	23	19	6	13	29	18
Education	113	34	212	65	325	44	38	64	30	108	33
Business Administration	37	62	22	37	59	9	24	8	36	17	28
Physical Sciences	103	84	19	15	122	24	23	3	15	27	22
Social Sciences	54	76	17	23	71	13	24	3	17	16	22
Humanities	17	24	52	75	69	4	23	11	21	15	21
Fine Arts	8	28	20	71	28	4	50	8	40	12	42
Life Sciences	33	68	15	31	48	16	48	2	13	18	37
Interdisciplinary Master's	12	63	7	36	19	2	16	1	14	3	15
Interdisciplinary Doctoral	5	62	3	37	8	2	40	0	0	2	25
Unclassified	25	46	29	53	54	25	100	29	100	54	100
Total	617	57	454	42	1071	191	30	142	31	333	31

Appendix Table A8. Attrition among the demographic groups in the several disciplinary areas: Foreign students enrolled in Fall 1980.

Disciplinary Area	Enrollment					Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	47	94	3	6	50	15	31	1	33	16	32
Agriculture	67	91	6	8	73	8	11	0	0	8	10
Education	6	100	0	0	6	2	33	0	0	2	33
Business Administration	2	100	0	0	2	0	0	0	0	0	0
Physical Sciences	22	84	4	15	26	2	9	1	25	3	11
Social Sciences	2	100	0	0	2	1	50	0	0	1	50
Humanities	0	0	0	0	0	0	0	0	0	0	0
Fine Arts	2	100	0	0	2	1	50	0	0	1	5
Life Sciences	2	100	0	0	2	0	0	0	0	0	0
Interdisciplinary Master's	3	100	0	0	3	0	0	0	0	0	0
Interdisciplinary Doctoral	0	0	0	0	0	0	0	0	0	0	0
Unclassified	1	100	0	0	1	0	0	0	0	0	0
Total	154	91	14	8	168	29	18	2	14	31	18

Appendix Table A9. Attrition among the demographic groups in the several disciplinary areas: Ethnic students enrolled in Fall 1980.

	Enrolled Students					No Degree by July 1986					
	Male	Percent Male	Female	Percent Female	Total	Male	Percent Male	Female	Percent Female	Total	Percent
Engineering	12	92	1	7	13	7	58	0	0	7	53
Agriculture	9	60	6	40	15	3	33	1	16	4	26
Education	48	41	69	58	117	17	35	19	27	36	30
Business Administration	9	81	2	18	11	1	11	1	50	2	18
Physical Sciences	6	75	2	25	8	5	83	1	50	6	75
Social Sciences	11	73	4	26	15	1	9	3	75	4	26
Humanities	1	8	11	91	12	0	0	2	18	2	16
Fine Arts	0	0	1	100	1	0	0	1	100	1	100
Life Sciences	3	100	0	0	3	0	0	0	0	0	0
Interdisciplinary Master's	1	100	0	0	1	1	100	0	0	1	100
Interdisciplinary Doctoral	0	0	0	0	0	0	0	0	0	0	0
Unclassified	3	27	8	72	11	3	100	8	100	11	100
Total	103	49	104	50	207	38	36	36	34	74	35

Appendix Table A10. Attrition among the demographic groups in the several disciplinary areas: Anglo students enrolled in Fall 1981.

Disciplinary Area	Enrollment					Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	95	88	12	11	107	32	33	2	16	34	31
Agriculture	102	70	43	29	145	14	13	13	30	27	18
Education	96	30	217	69	313	36	37	74	34	110	35
Business Administration	40	57	30	42	70	10	25	6	20	16	22
Physical Sciences	106	74	36	25	142	31	29	7	19	38	26
Social Sciences	35	61	22	38	57	11	31	6	27	17	29
Humanities	19	27	49	72	68	5	26	15	30	20	29
Fine Arts	9	31	20	68	29	3	33	7	35	10	34
Life Sciences	26	57	19	42	45	13	50	4	21	17	37
Interdisciplinary Master's	10	58	7	41	17	2	20	1	14	3	17
Interdisciplinary Doctoral	4	57	3	42	7	1	25	0	0	1	14
Unclassified	20	37	33	62	53	18	90	32	96	50	94
Total	562	53	491	46	1053	176	31	167	34	343	32

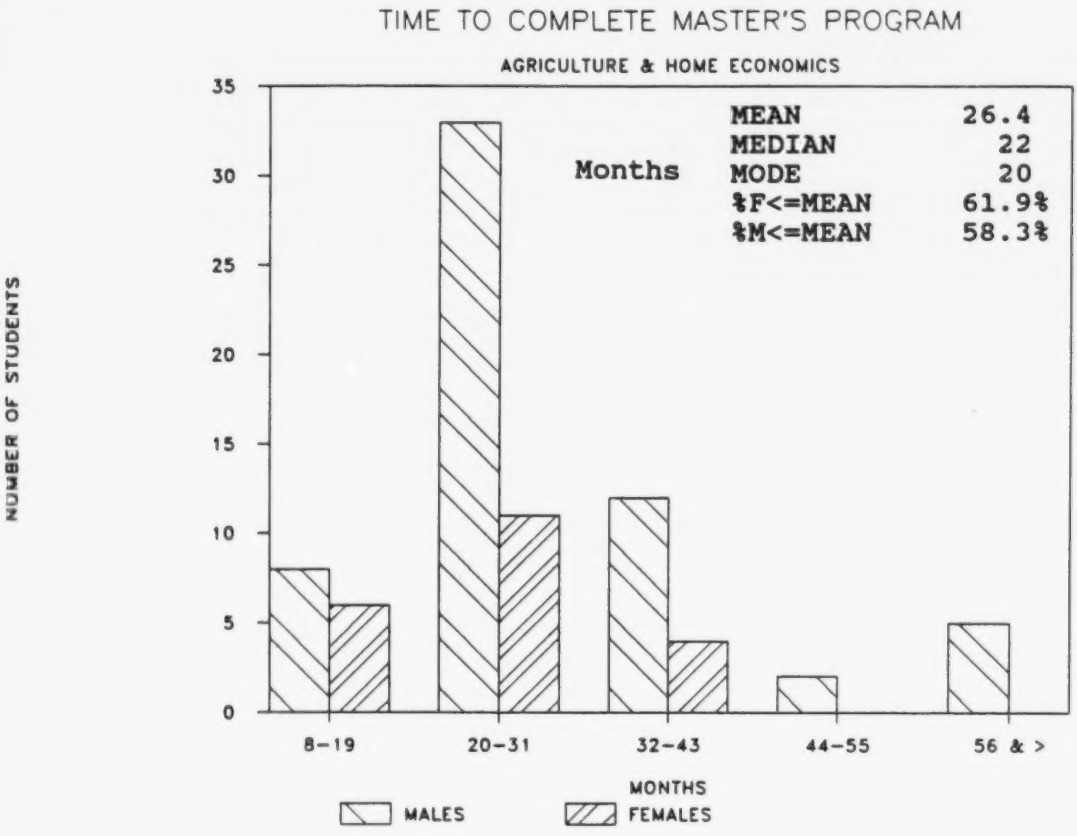
Appendix Table A11. Attrition among the demographic groups in the several disciplinary areas: Foreign students enrolled in Fall 1981.

Disciplinary Area	Enrollment					Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	73	93	5	6	78	27	36	1	20	28	35
Agriculture	77	93	5	6	82	14	18	0	0	14	17
Education	6	85	1	14	7	2	33	1	100	3	42
Business Administration	2	66	1	33	3	0	0	0	0	0	0
Physical Sciences	27	90	3	10	30	7	25	0	0	7	23
Social Sciences	2	100	0	0	2	0	0	0	0	0	0
Humanities	0	0	1	100	1	0	0	0	0	0	0
Fine Arts	2	66	1	33	3	2	100	0	0	2	66
Life Sciences	6	100	0	0	6	1	16	0	0	1	16
Interdisciplinary Master's	3	100	0	0	3	0	0	0	0	0	0
Interdisciplinary Doctoral	0	0	0	0	0	0	0	0	0	0	0
Unclassified	2	100	0	0	2	2	100	0	0	2	100
Total	200	92	17	70	217	55	27	2	11	57	26

Appendix Table A12. Attrition among the demographic groups in the several disciplinary areas: Ethnic students enrolled in Fall 1981.

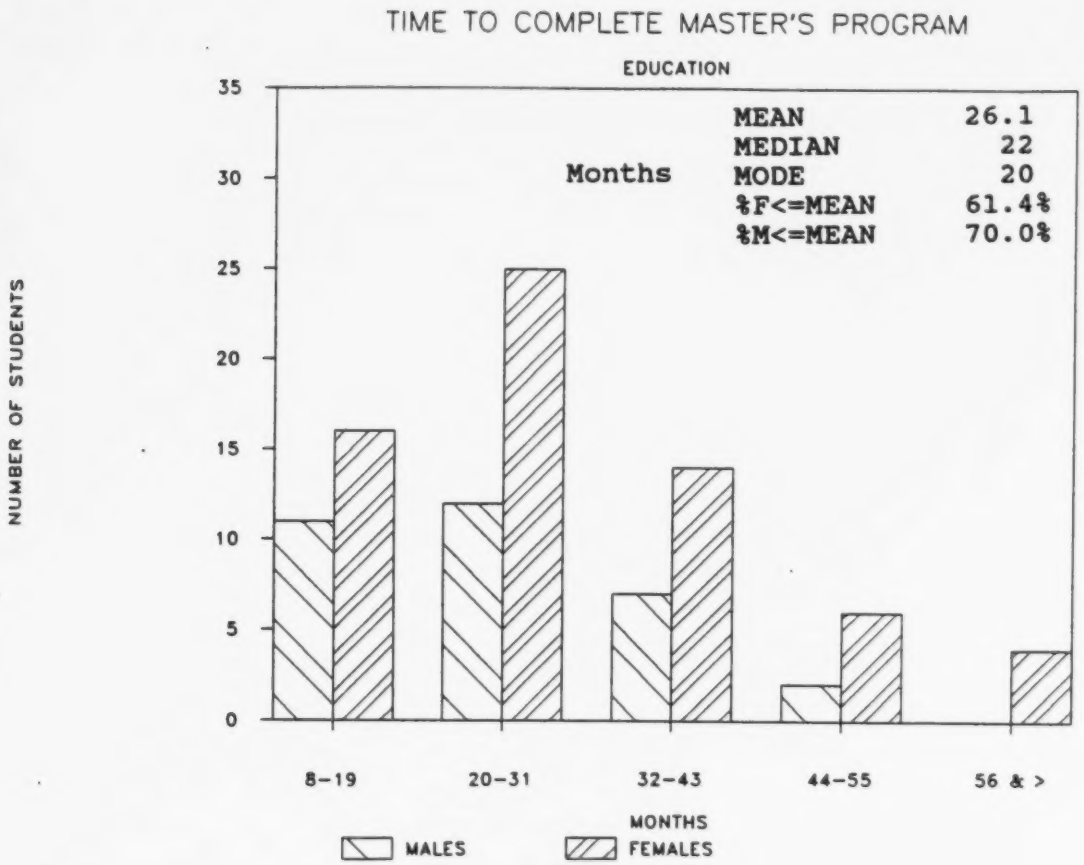
Disciplinary Area	Enrollment					Attrition					
	Male	Percent	Female	Percent	Total	Male	Percent	Female	Percent	Total	Percent
Engineering	11	0.84	2	0.15	13	5	0.45	1	0.50	6	0.46
Agriculture	11	0.64	6	0.35	17	3	0.27	2	0.33	5	0.29
Education	33	0.32	68	0.67	101	10	0.30	30	0.44	40	0.39
Business Administration	14	0.87	2	0.12	16	2	0.14	1	0.50	3	0.18
Physical Sciences	7	0.70	3	0.30	10	3	0.42	2	0.66	5	0.50
Social Sciences	12	0.75	4	0.25	16	3	0.25	2	0.50	5	0.31
Humanities	3	0.18	13	0.81	16	0	0.0	4	0.30	4	0.25
Fine Arts	3	0.75	1	0.25	4	2	0.66	1	1.00	3	0.75
Life Sciences	4	0.66	2	0.33	6	0	0.0	2	1.00	2	0.33
Interdisciplinary Master's	0	0.0	1	1.00	1	0	0.0	0	0.0	0	0.0
Interdisciplinary Doctoral	0	0.0	0	0.0	0	0	0.0	0	0.0	0	0.0
Unclassified	6	0.31	13	0.68	19	6	1.0	13	1.0	19	1.0
TOTAL	104	0.47	115	0.52	219	34	0.32	58	0.50	92	0.42

APPENDIX FIGURE A1



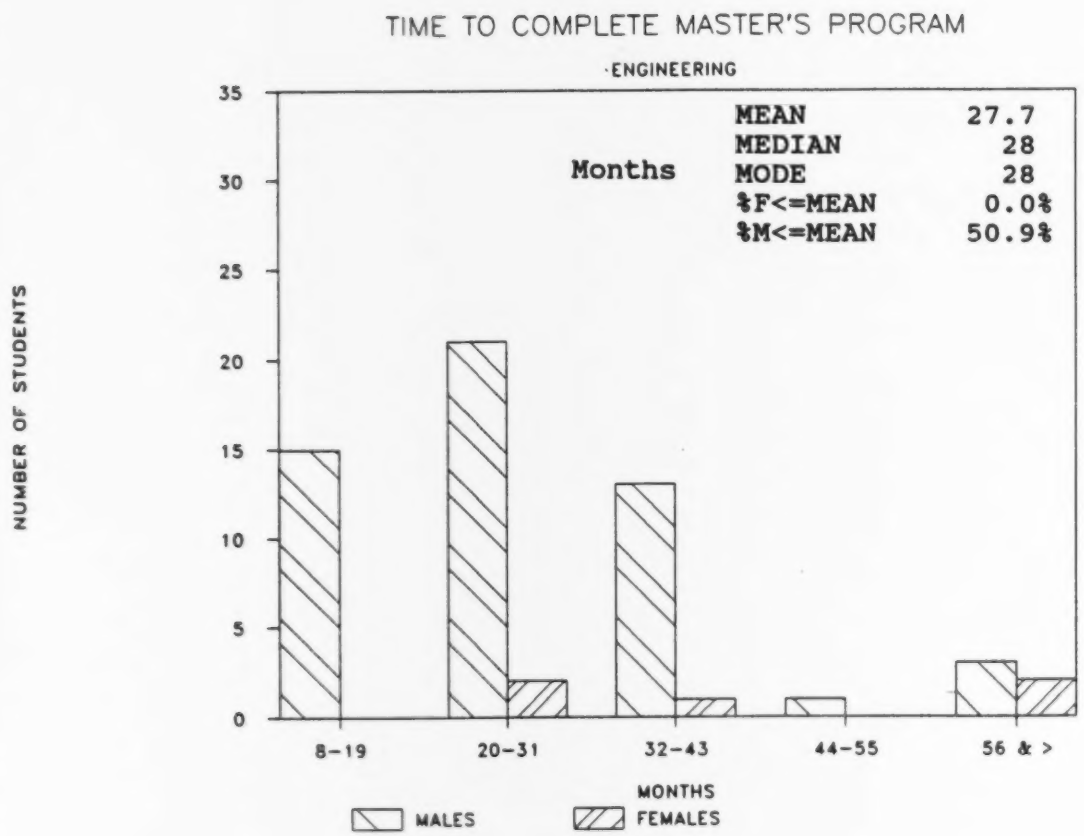
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A2



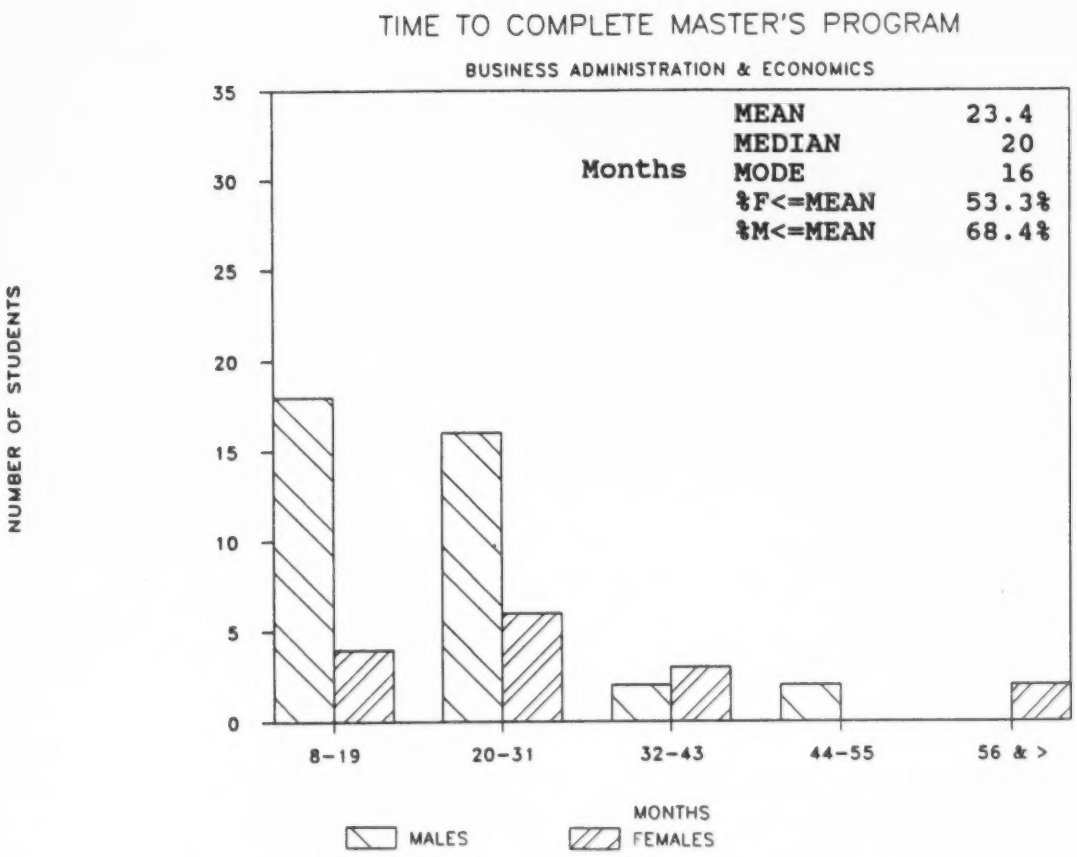
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A3



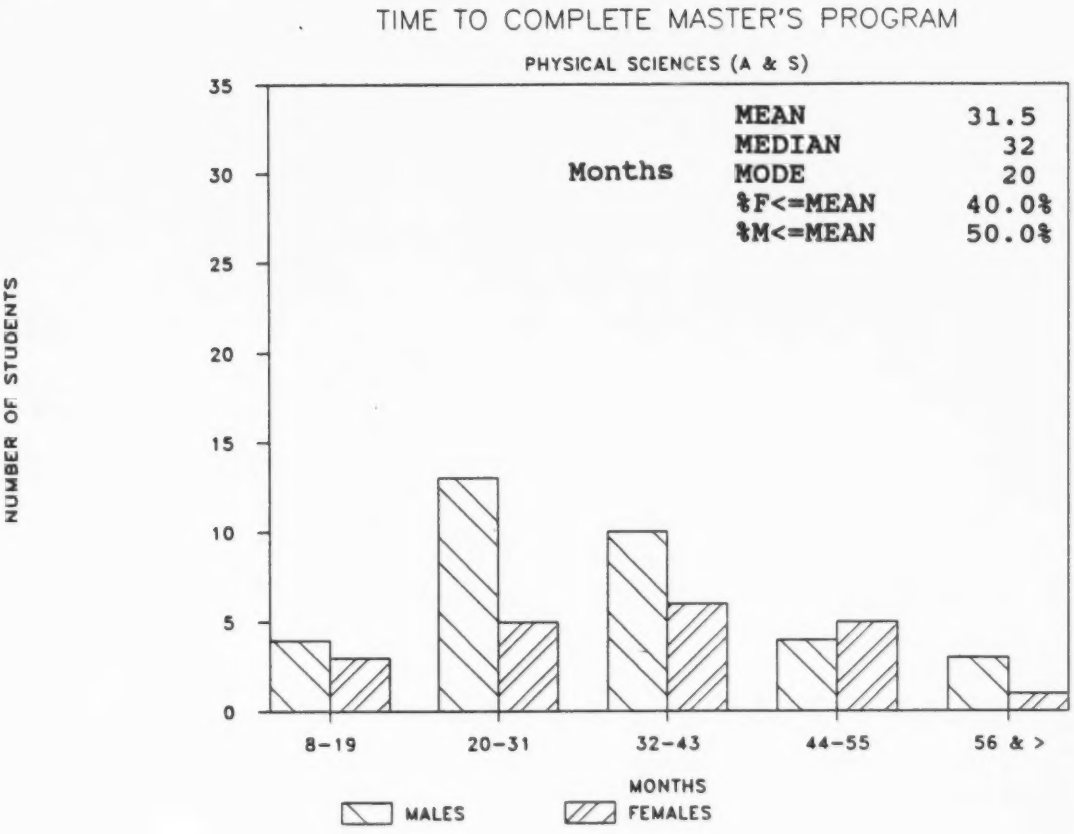
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A4



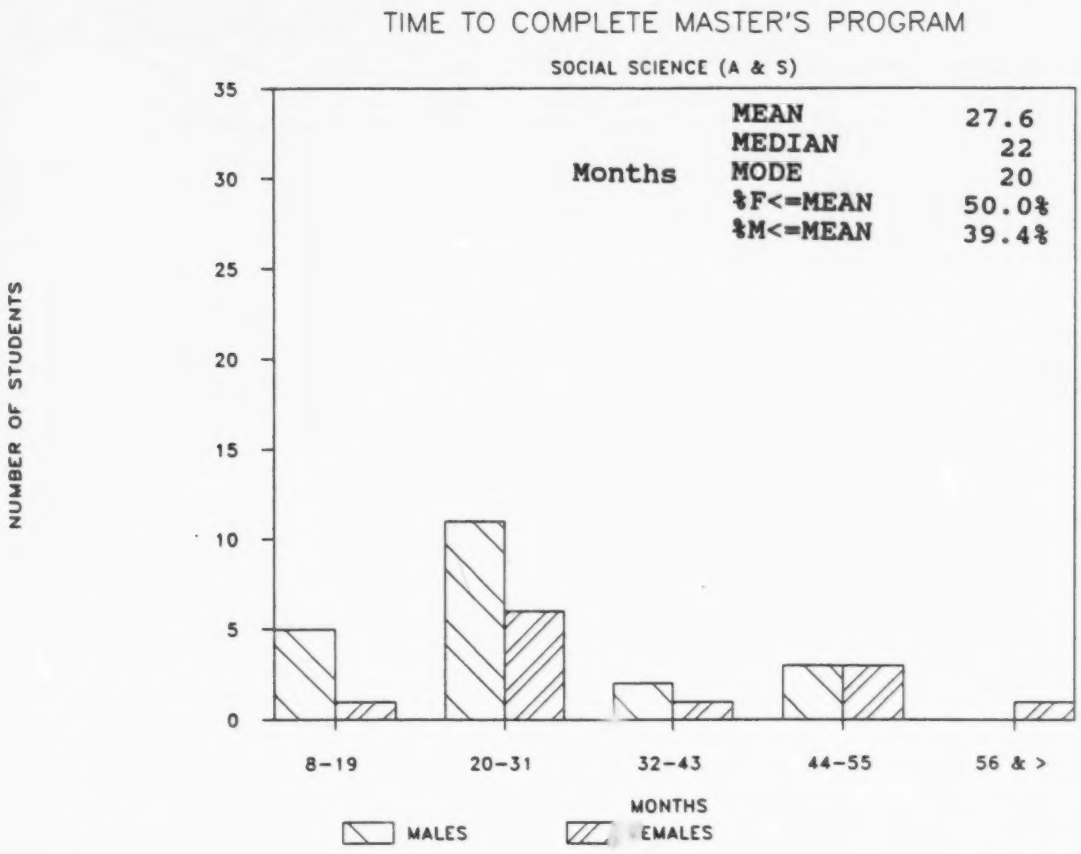
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A5



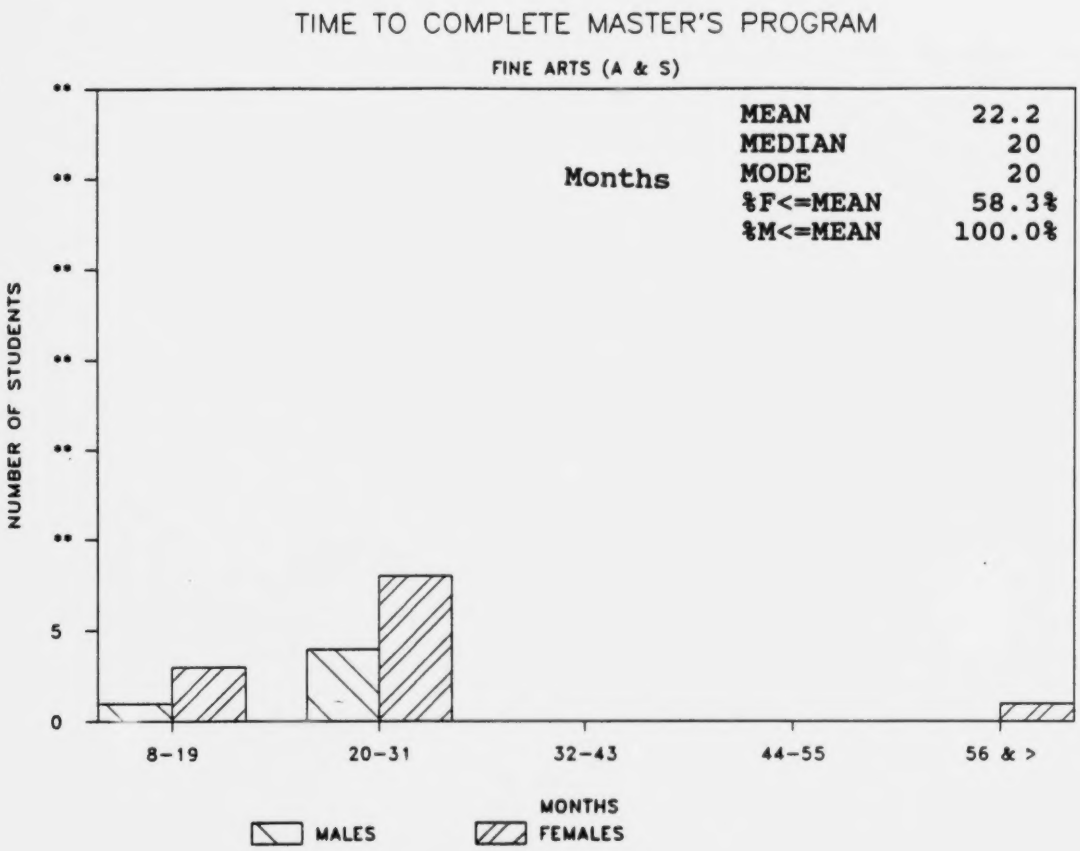
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A6



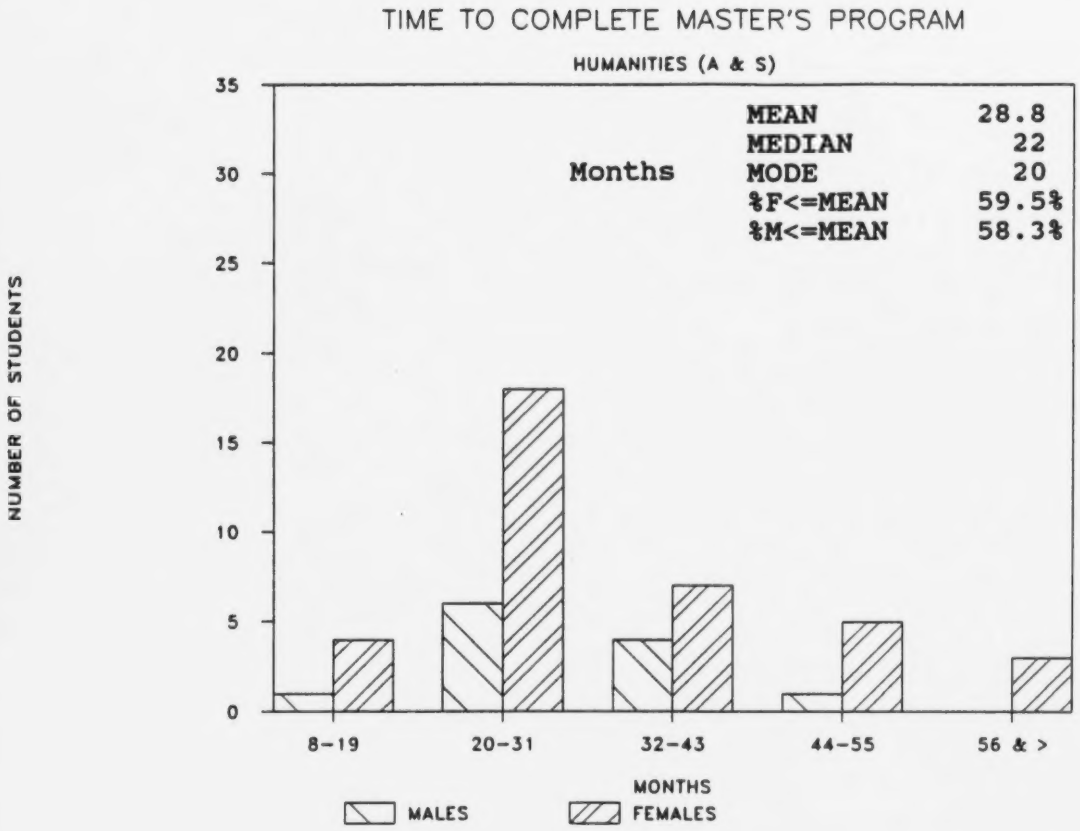
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A7



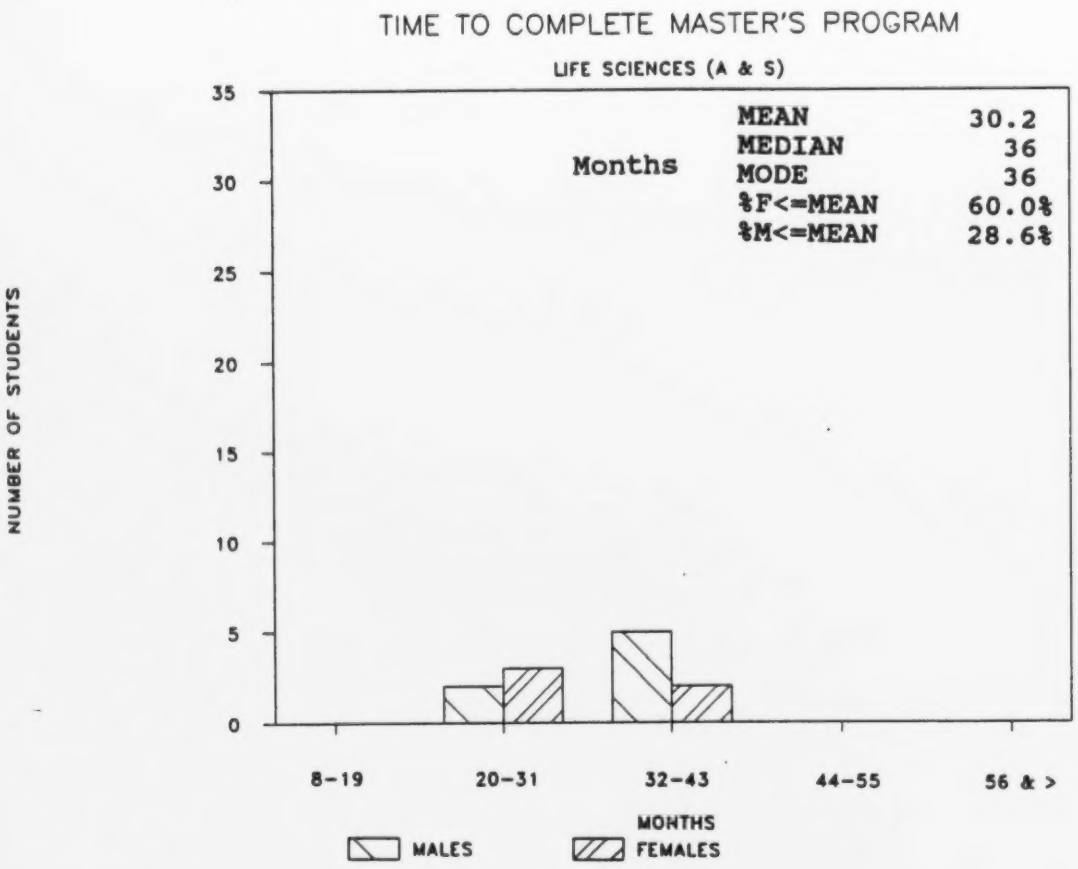
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A8



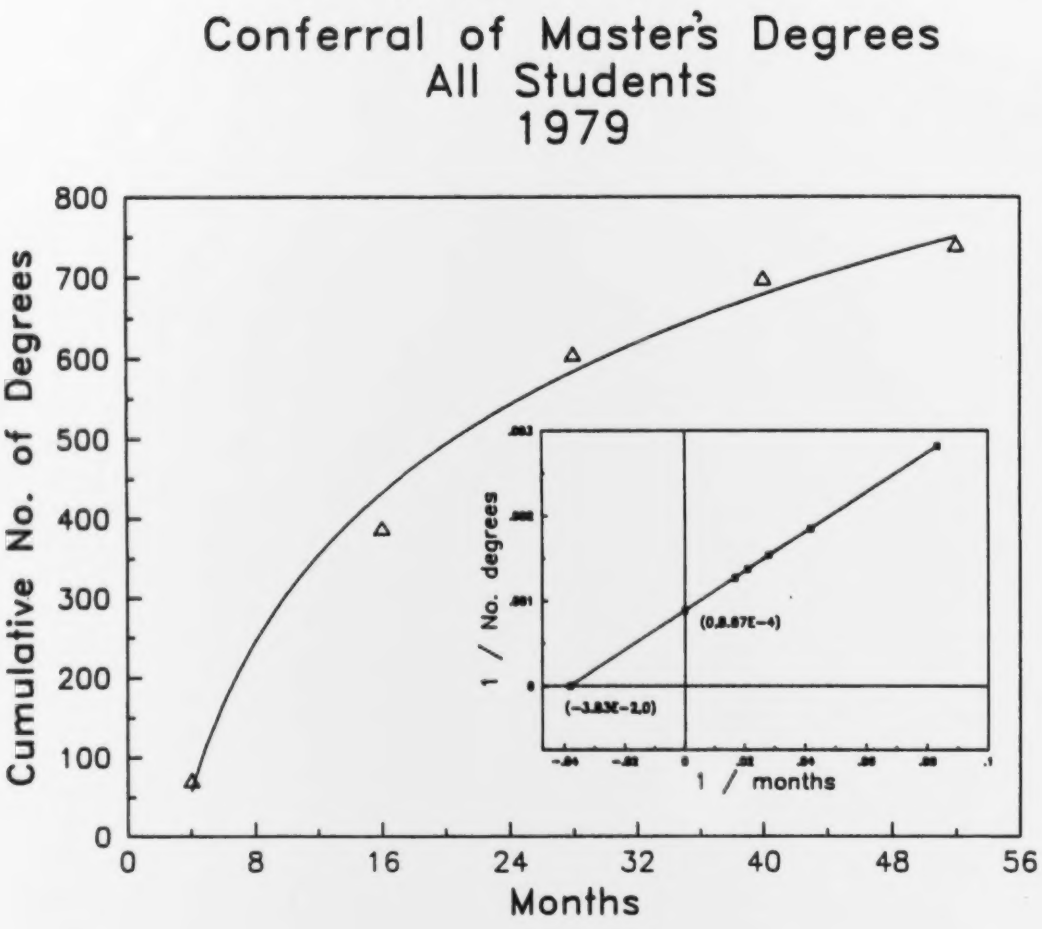
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A9



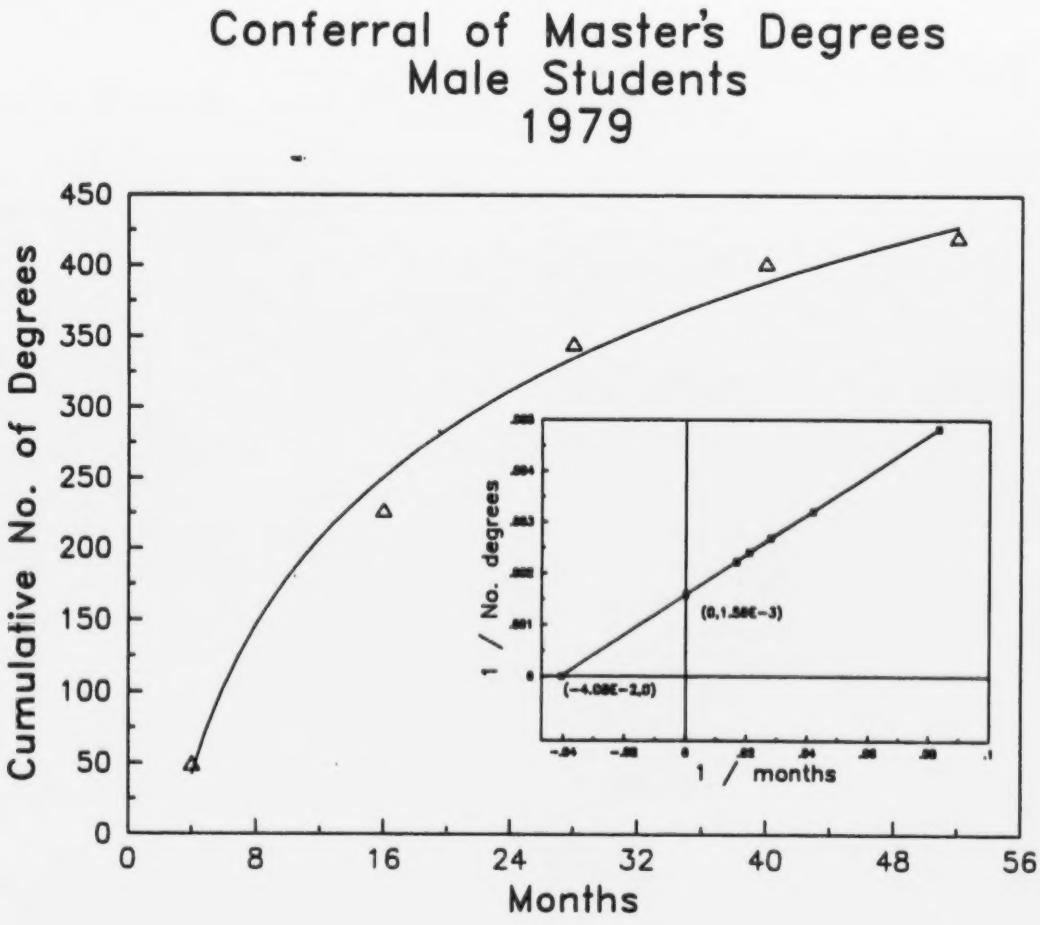
Legend. The height of the bars indicates the number of students of each sex completing their master's programs within the time frames indicated on the abscissa. The numbers in the inset indicate mean, median, and modal times for completion. Also shown is the percentage of each gender completing in a time less than or equal to the mean time.

APPENDIX FIGURE A10



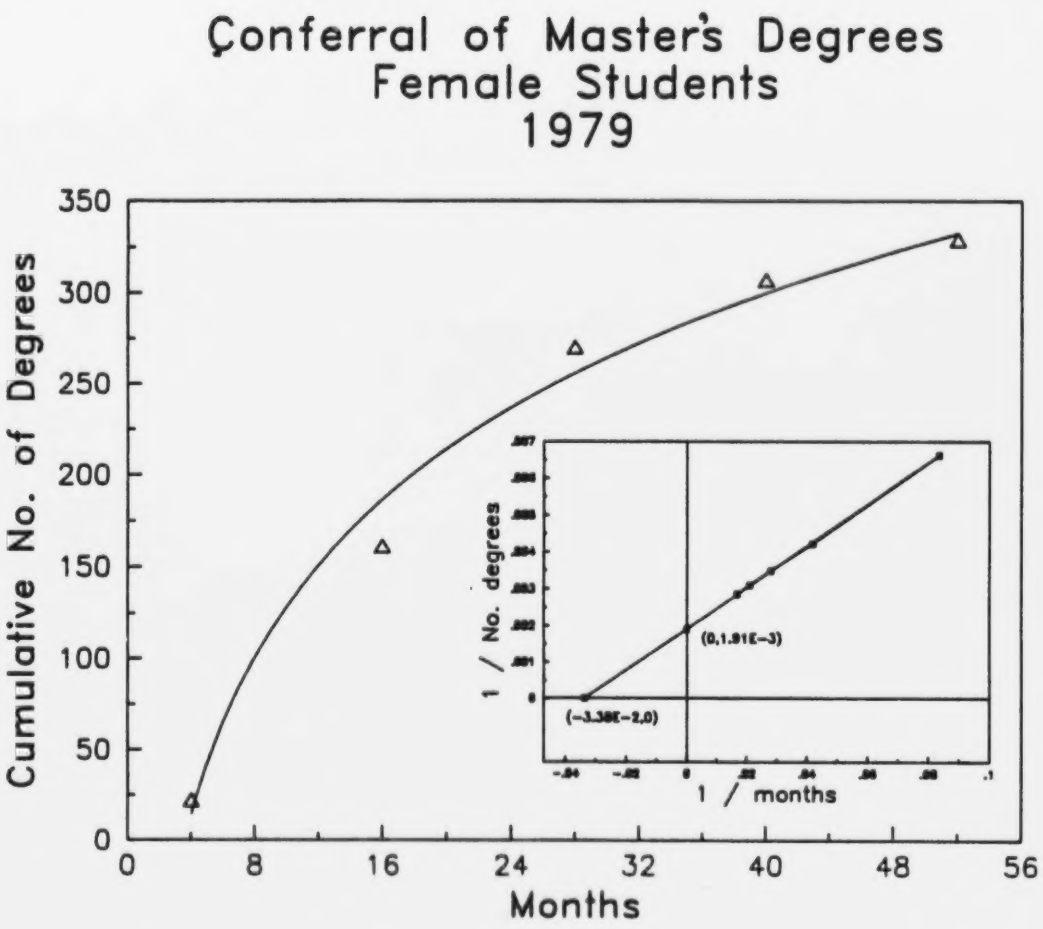
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A11



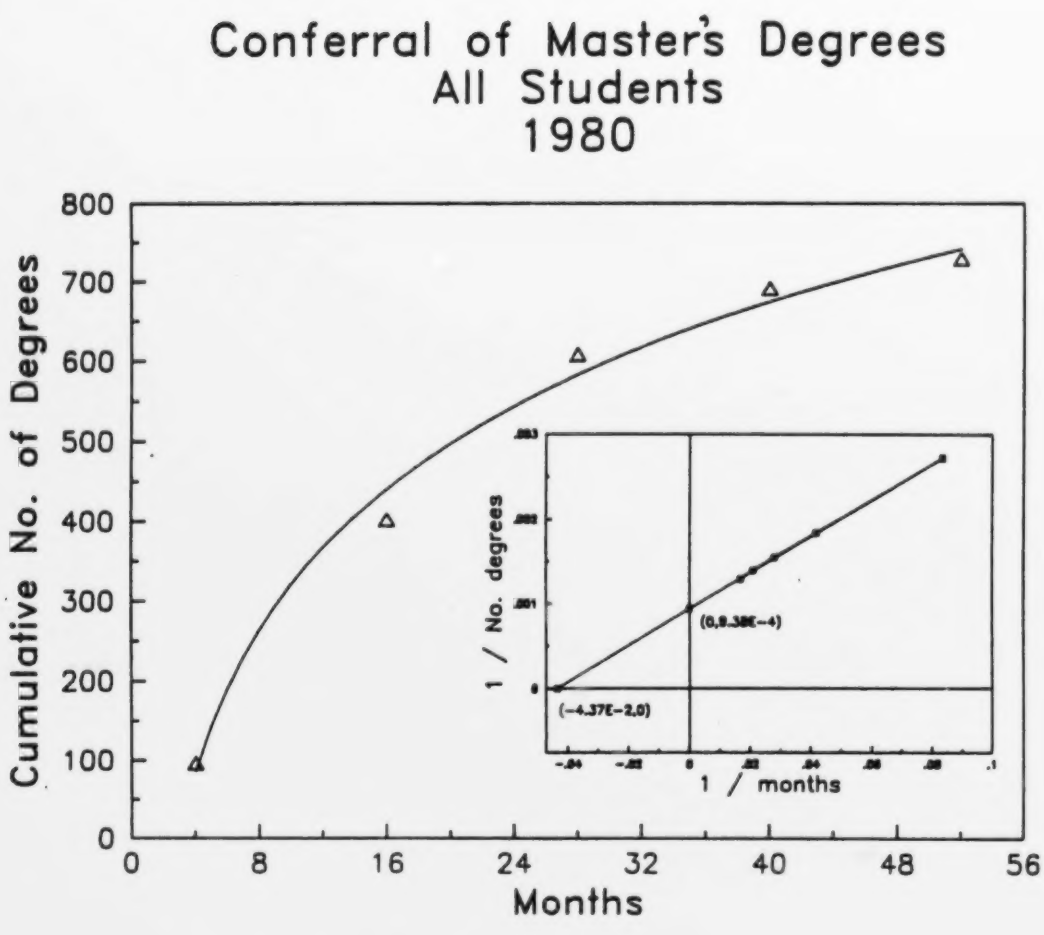
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A12



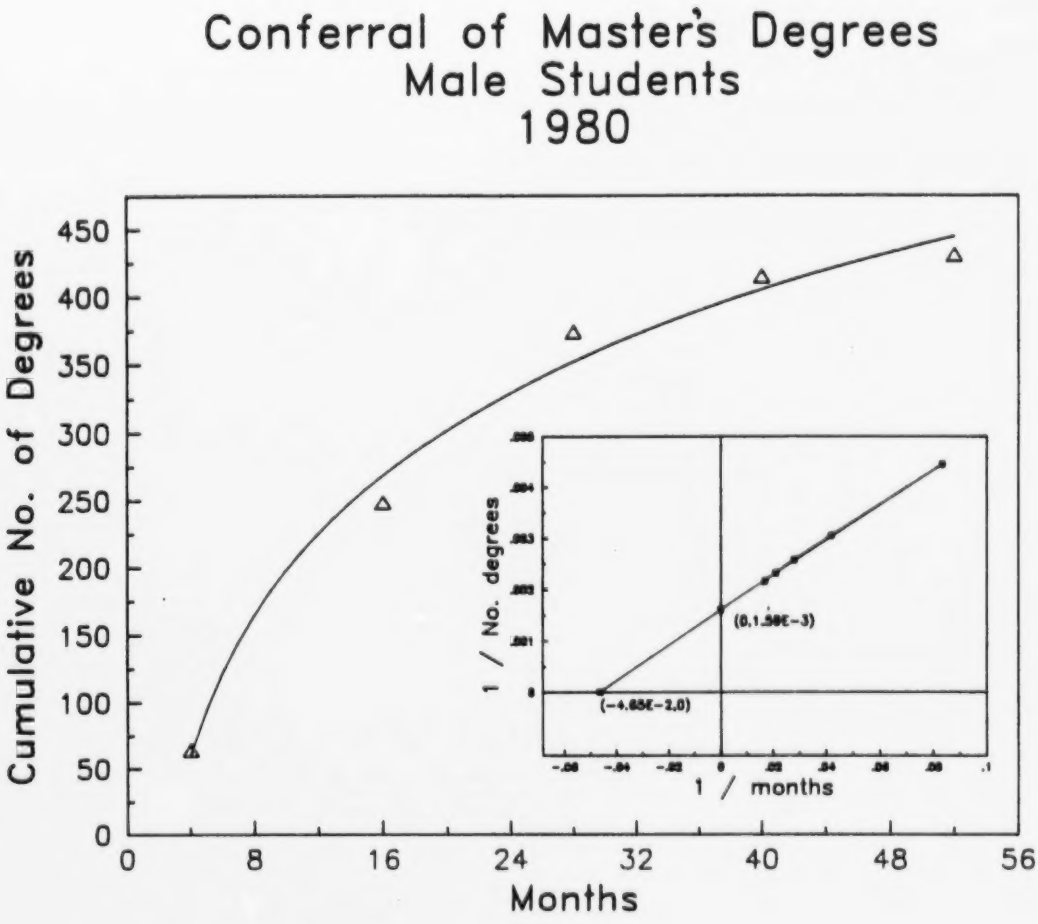
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A13



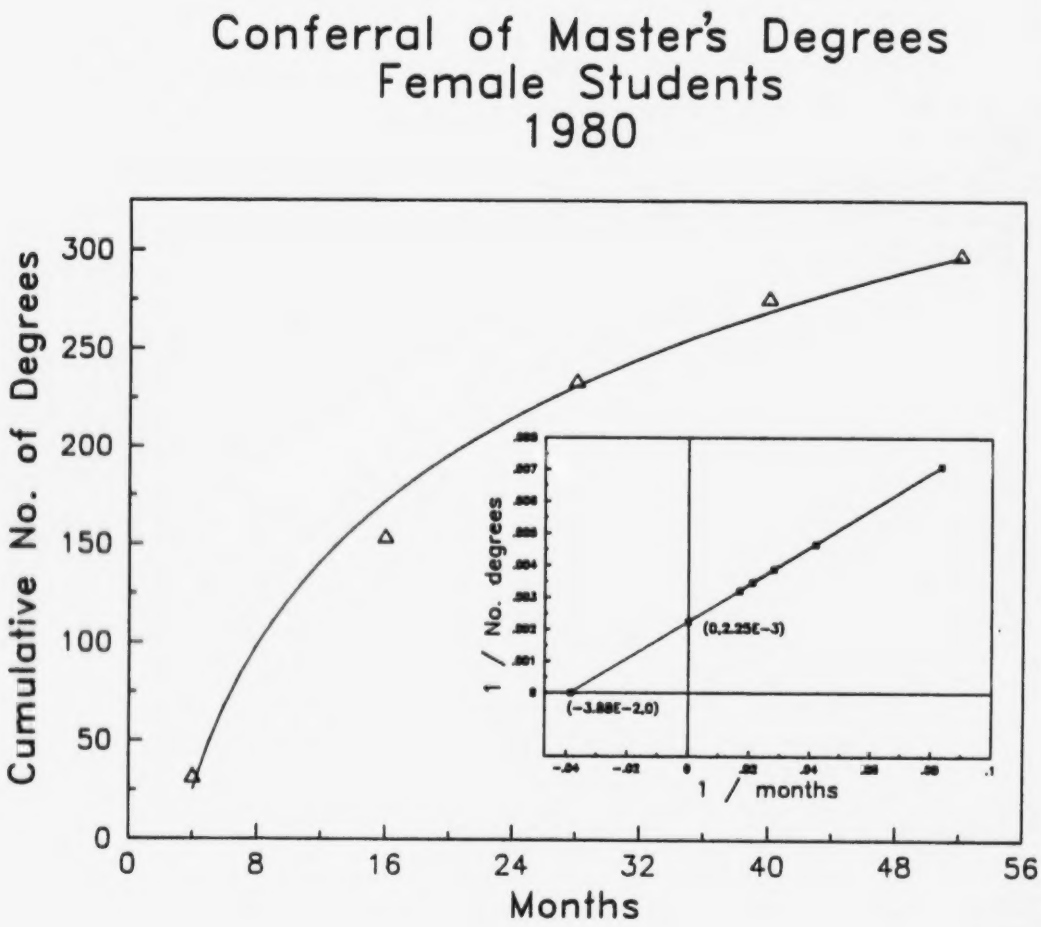
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A14



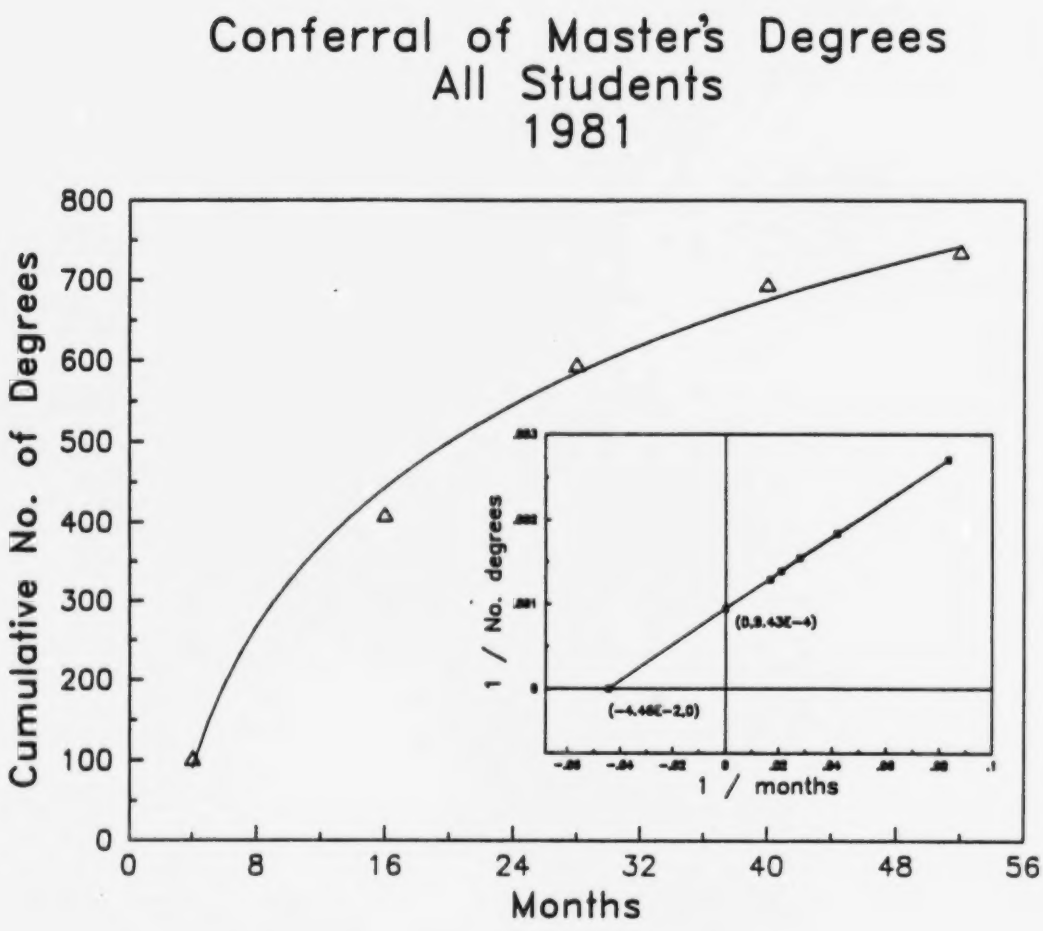
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A15



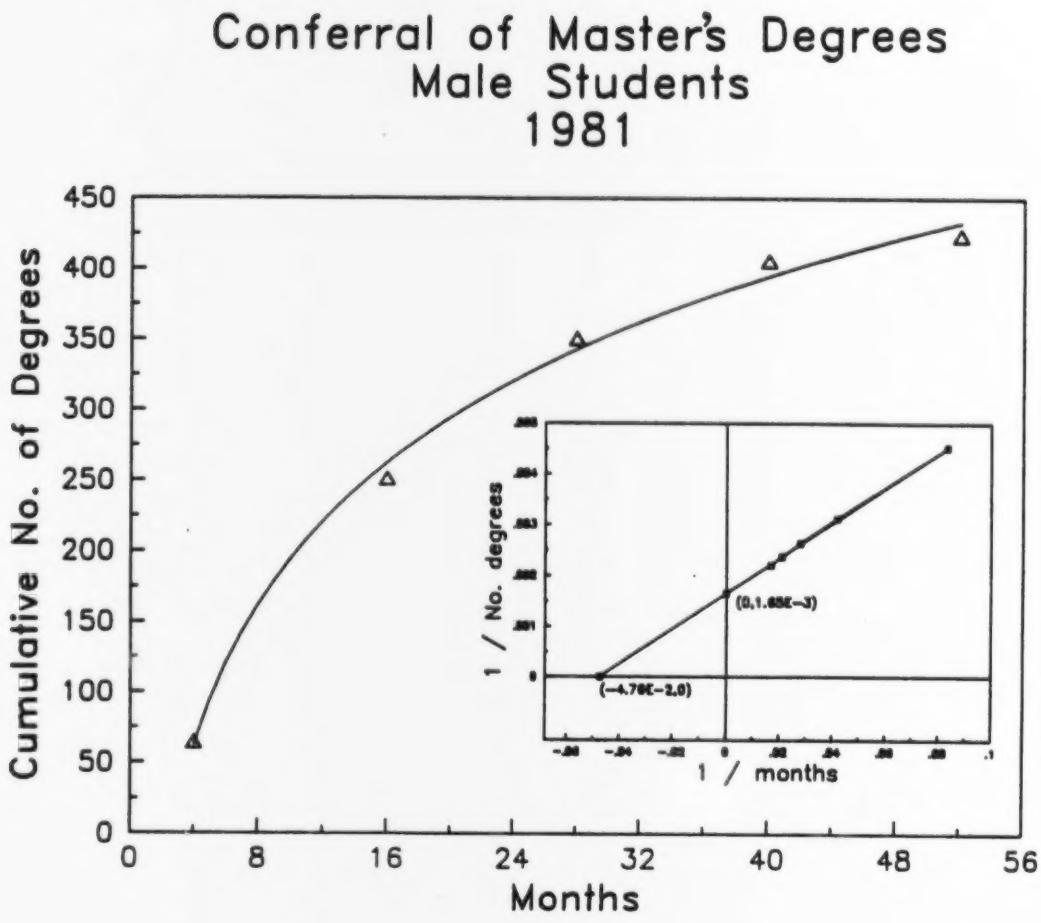
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A16



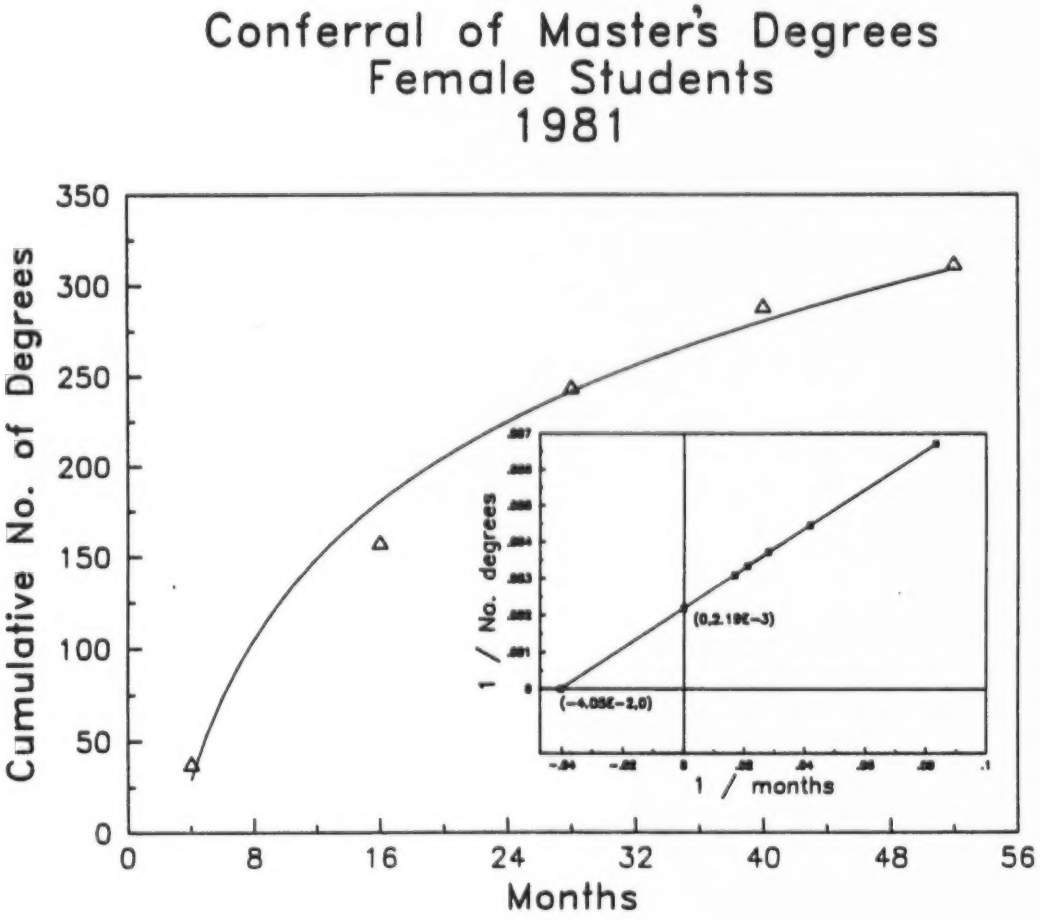
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A17



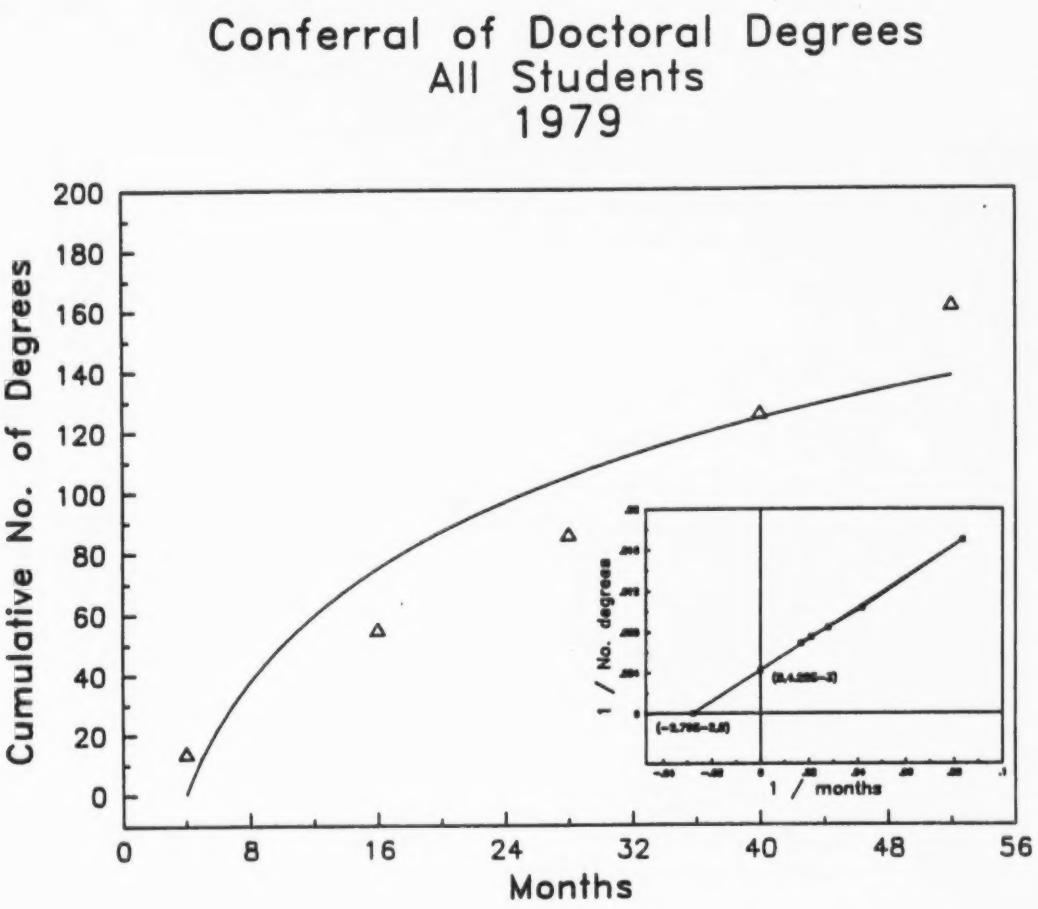
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal

APPENDIX FIGURE A18



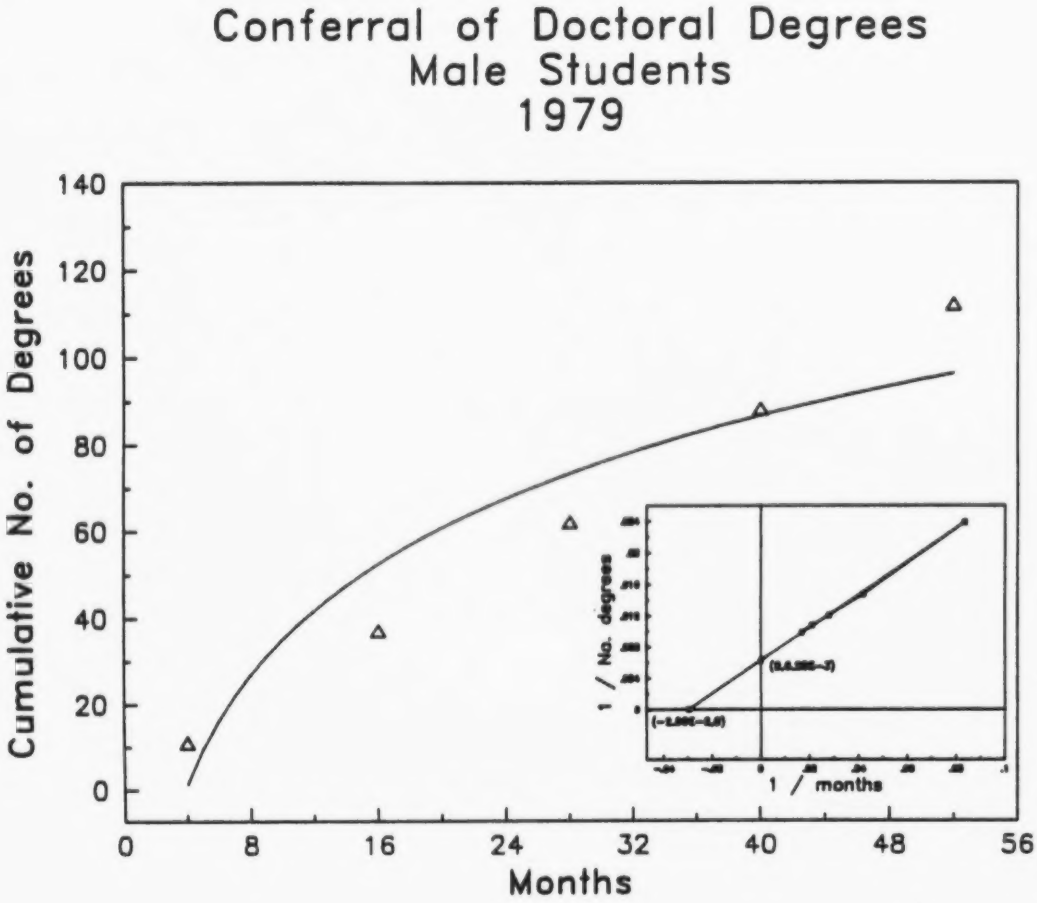
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A19



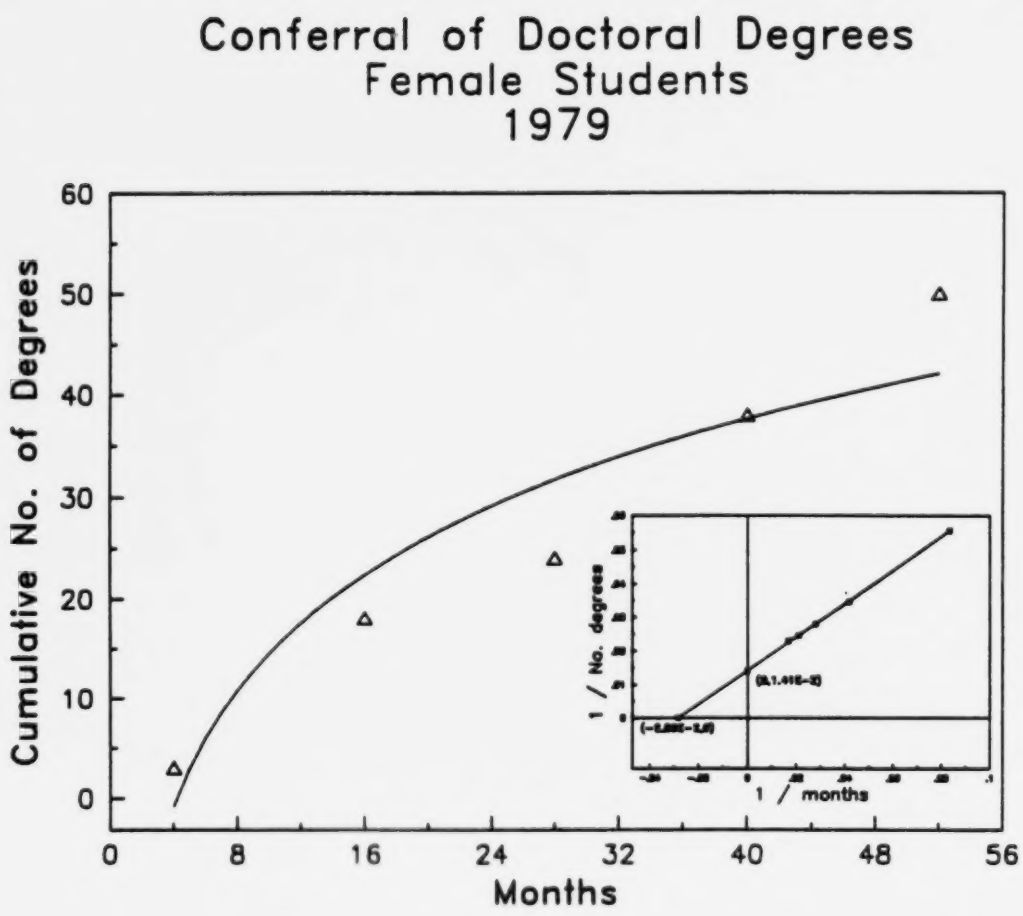
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A20



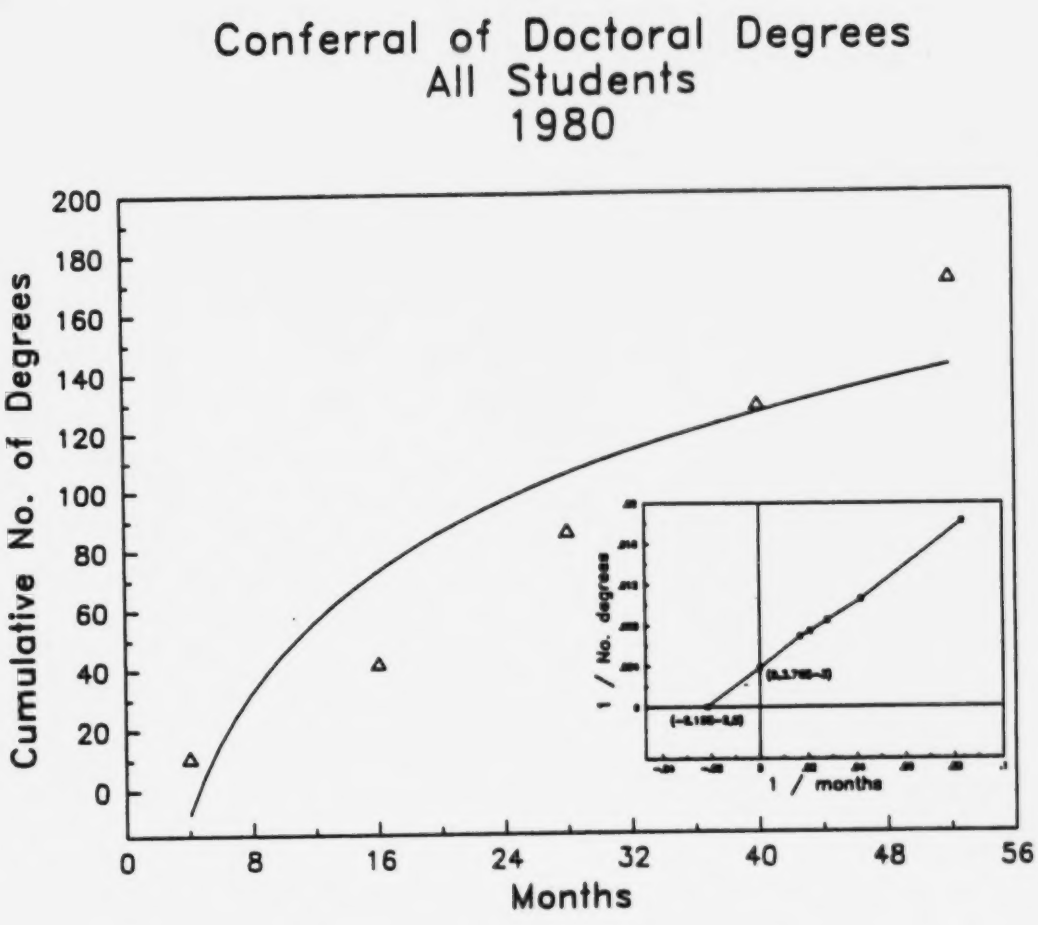
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A21



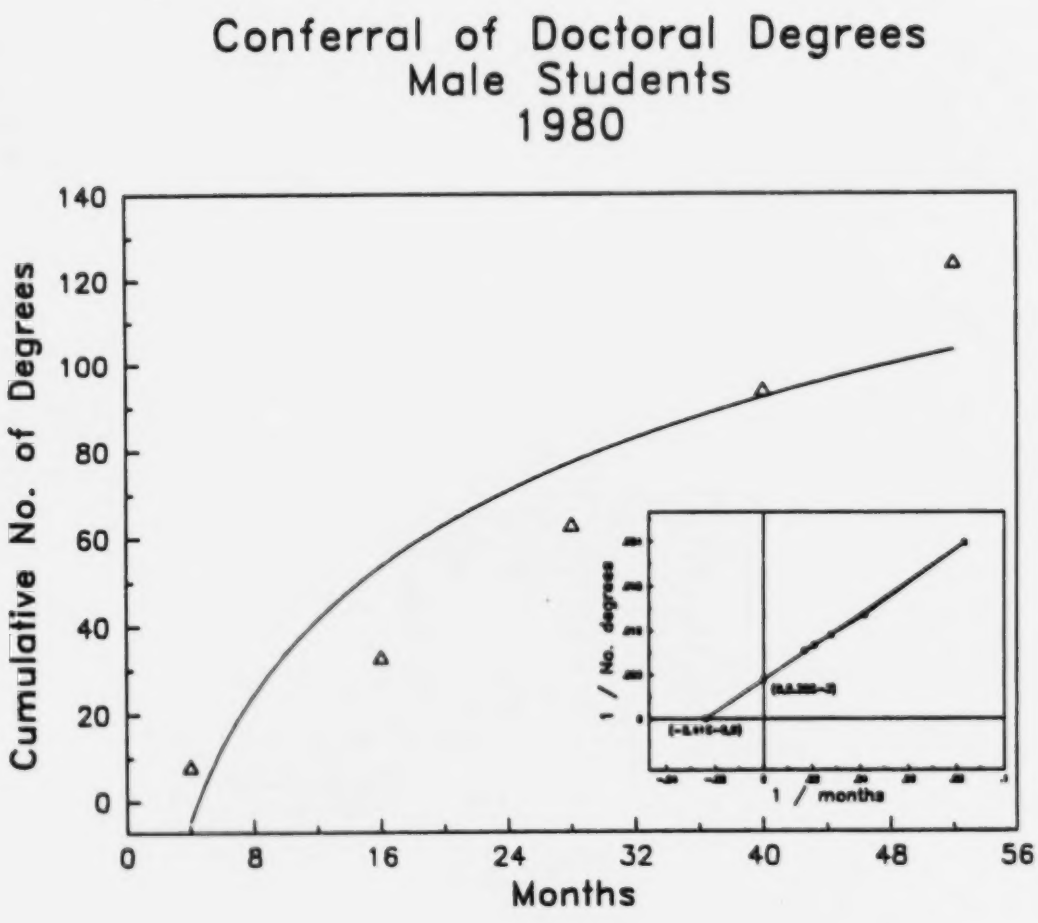
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A22



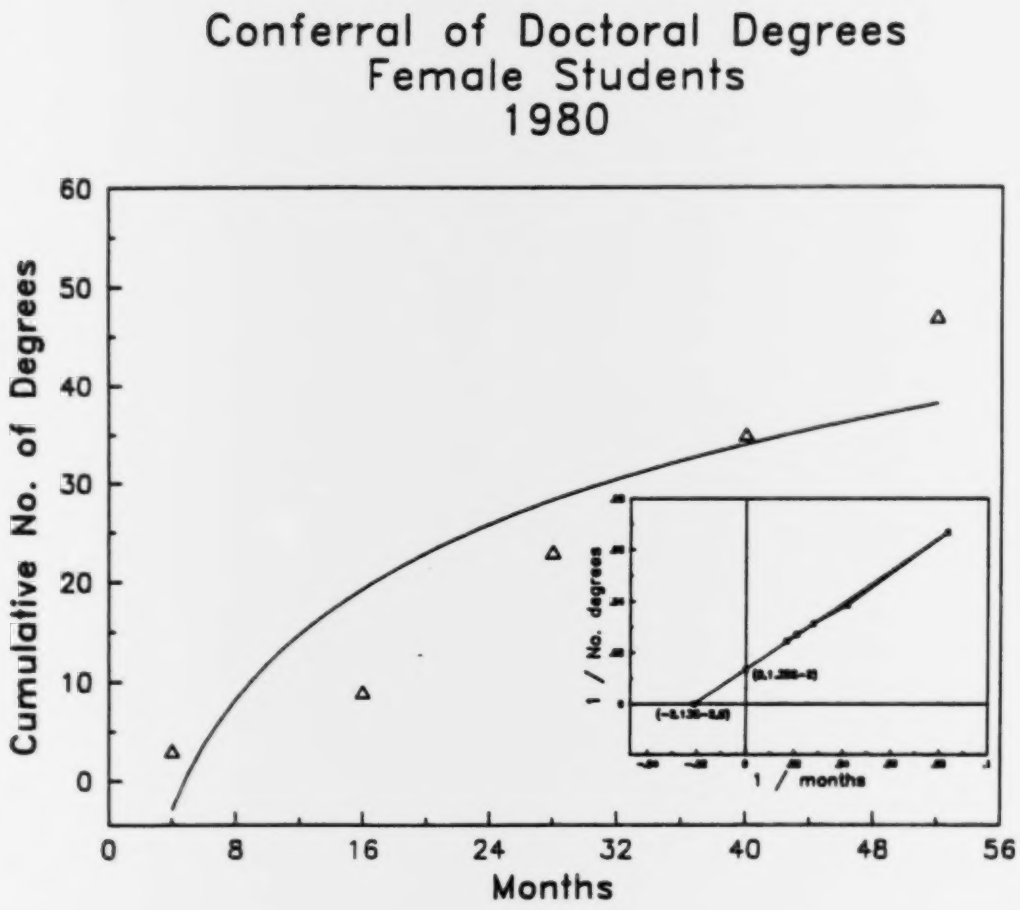
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A23



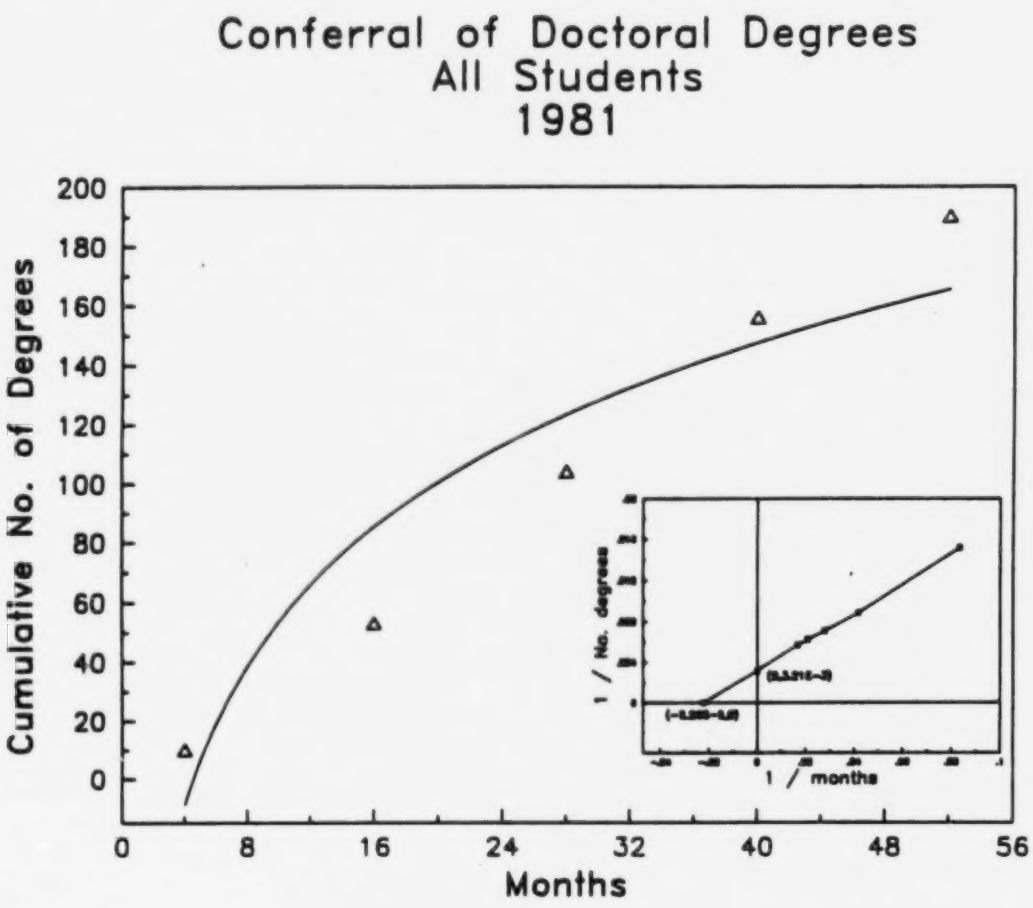
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A24



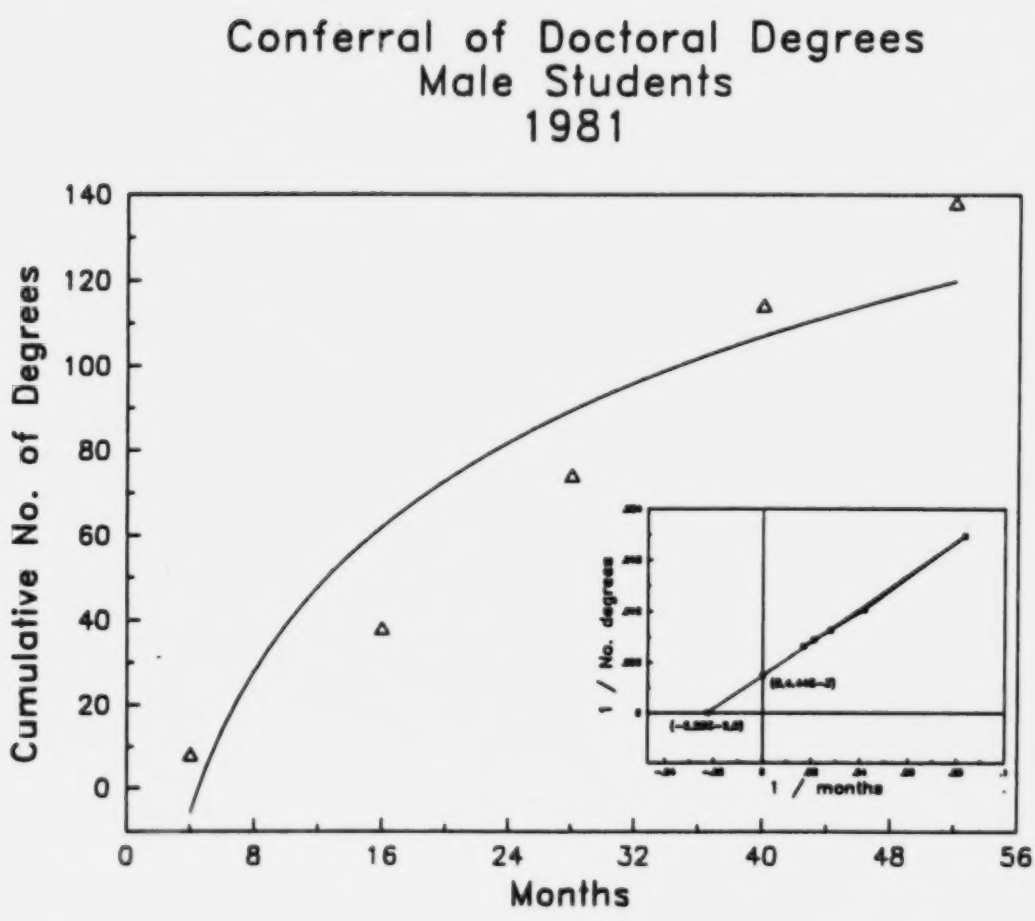
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A25



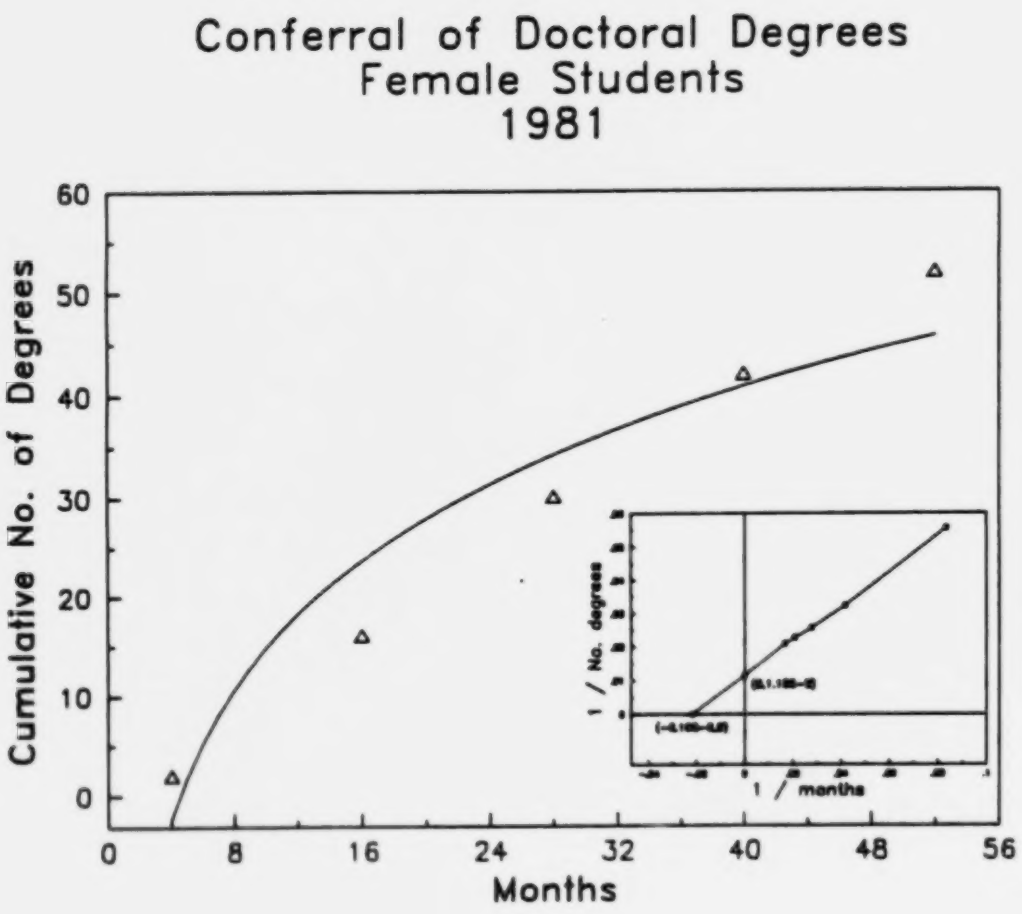
Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A26



Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.

APPENDIX FIGURE A27



Legend. The values on the ordinant are cumulative number of degrees conferred. The values on the abscissa are months. The inset shows a double reciprocal plot based on the data. Numerical values (in scientific notation) for the ordinal and abscissal intercepts are given in parentheses. See text for further explanation.